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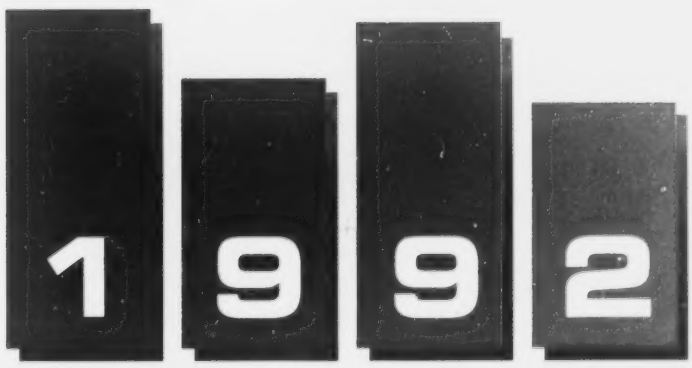
THE TRANSPORTATION & BUSINESS LOGISTICS MAGAZINE JULY 1992



Logistics Annual Report

Warehousing: A Review for Management

Green Book of Warehousing

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Every effort has been made to make this Logistics Annual Report and the Green Book of Warehousing as complete and accurate as possible. Because of space limitations, DISTRIBUTION Magazine exercised its right to select those listings the editors believed to be most appropriate for its readers. DISTRIBUTION Magazine takes no responsibility for errors or omissions due to information incorrectly reported to the editors, changes not reported to the editors, or information reported too late to be included in this issue.

Logistics costs for 1991 enjoyed their biggest drop in recent history.

In a Difficult Year, Logistics Shines

After a five-year productivity drought, logistics kicks in with some eye-popping improvements. The key was our ability to manage inventories.

By Thomas A. Foster, Editorial Director

No matter how you measure it, the logistics industry in 1991 performed brilliantly during a very difficult year.

After a five-year plateau, logistics operating costs in 1991 were actually lower than in 1990. The real cost of the physical distribution system dropped $13 billion, from the 1990 level of $600 billion to $587 billion last year. The real cost across the entire logistics supply chain dropped $23 billion, from a 1990 level of $678 billion to $655 billion in 1991.

Cass Logistics' Executive Vice President Robert Delaney has been tracking such costs for more than 20 years, and he says this turnaround is nothing short of amazing. He attributes the savings to lower investment in inventory, declining interest rates and tight control over transportation costs. He suggests the savings may even be $2 billion to $3 billion higher. "We will know when the Eno Foundation publishes actual transportation costs for 1991," he says.

This year, Delaney enhanced his compilation of statistics with two sets of costs numbers: one for the physical distribution system and one for the logistics supply chain system.

The numbers in the physical

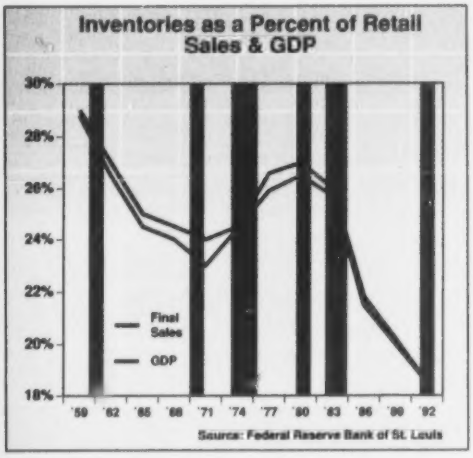
continued

U.S. LOGISTICS COSTS ($ Billion except GDP)

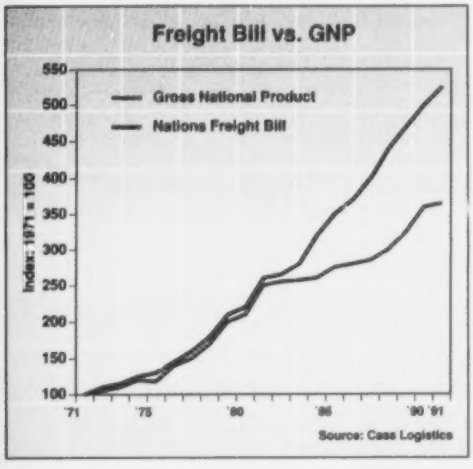
Year	GDP $ Trillion	Value of Business Inventory	Inventory Carrying Rate	Inventory Carrying Costs	Transportation Costs	Administrative Costs	Total U.S. Logistics Costs	Logistics % of GDP
1972	1.206	285	.250	71	97	7	175	14.5
1973	1.349	339	.272	92	108	8	208	15.4
1974	1.458	410	.290	119	116	9	244	16.7
1975	1.585	433	.253	110	116	9	235	14.8
1976	1.767	462	.250	116	133	10	259	14.6
1977	1.974	504	.250	126	150	11	287	14.5
1978	2.232	574	.270	155	175	13	343	15.4
1979	2.488	665	.300	200	193	16	409	16.4
1980	2.708	765	.317	243	205	18	466	17.2
1981	3.031	826	.343	283	236	21	540	17.9
1982	3.150	824	.309	255	240	20	515	16.3
1983	3.405	817	.279	228	244	19	491	14.4
1984	3.777	882	.291	257	250	20	527	14.0
1985	4.038	896	.268	240	265	20	525	13.0
1986	4.269	893	.261	233	271	20	524	12.3
1987	4.540	923	.263	243	288	21	552	12.2
1988	4.900	996	.267	266	313	23	602	12.3
1989	5.244	1066	.292	311	331	26	668	12.7
1990	5.514	1099	.272	298	354	26	678	12.3
1991	5.673	1080	.250	270	360	25	655	11.6

Source: Survey of Current Business; U.S. Statistical Abstract; U.S. Department of Commerce

Current inventory investment is $200 billion below 1981 levels.



Improved logistics has allowed for lower inventories during the current recession.



Transportation was only 6.3 percent of 1991 GDP—a 0.5 point drop.

distribution series include the costs for manufacturing, wholesale and trade inventory management, as well as the cost of transportation and administration. These physical distribution costs are compared to gross national product, the traditional measuring stick of our entire economy.

Starting this year, Delaney is also presenting a series of figures for what he calls the logistics supply chain. It includes the cost of *all* business inventory, including agriculture, mining, construction and service industries, in addition to manufacturing, wholesale and retail trade. Transportation and administration costs are also included. These costs are compared to gross domestic product, the economic measure now preferred by the U.S. Department of Commerce. Cass Logistics will maintain both sets of data.

Delaney says changes in logistics mandate changes in the way he compiles logistics statistics. "For more than 20 years our profession was known as physical distribution management," he says. "Our responsibility began at the end of the production line and included the management of transportation, warehousing and customer service."

The profession changed considerably during the decade of the 1980s. "Partial deregulation of surface transportation, the power of the personal computer and breakthroughs in communications enabled us to integrate our operation to a far greater degree than before," Delaney says. "In 1986, the NCPDM was renamed the Council of Logistics Management, and the scope of logistics was expanded to include the management of raw materials." Now, more and more of Cass's clients are adopting integrated logistics supply chain management. "For example, Libby Owens Ford manages the procurement of dolomite, soda ash, silica sand and hycalcium inbound in the same organization that manages finished product logistics," he says.

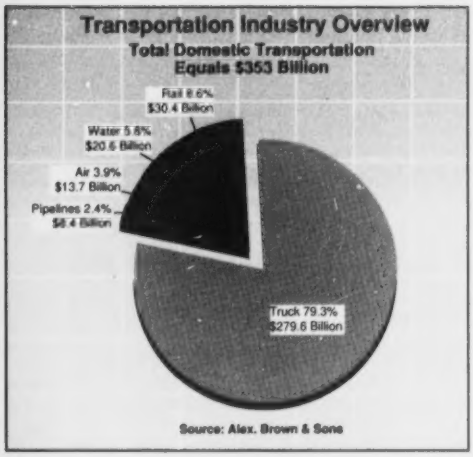
The government has also changed its scope. In early 1992, the Department of Commerce made significant

continued

COMPONENTS OF 1991 PHYSICAL DISTRIBUTION AND LOGISTICS COSTS
($ Billions)

	Physical Distribution System	Logistics System
Carrying Costs-Manufacturing & Trade Inventory		
Interest	$49	$65
Taxes, Obsolesence, Depreciation	97	144
Warehousing	68	61
Subtotal	204	270
Transportation Costs		
Motor Carriers		
Public and For Hire	79	79
Private and For Own Account	89	89
Local Freight Services	110	110
Subtotal	278	278
Other Carriers		
Railroads	31	31
Water Carriers	22	22
Oil Pipelines	9	9
Air Carriers	14	14
Forwarders	2	2
Subtotal	78	78
Shipper Related Costs	4	4
Distribution Administration	23	23
TOTAL PD/LOGISTICS COSTS	**$587**	**$655**

Source: Robert Delaney, Cass Logistics



In 1990, total domestic transportation costs were almost $354 billion. 1991 figures are not yet in.

revisions to national income and product accounts, and adopted the use of Gross Domestic Product to measure economic activity.

Even more important than the way these figures are compiled is the fact that logistics performance is again improving, bringing benefits to the entire economy. Since 1978, the relative cost of the physical distribution system has declined by 3 points of GNP. The relative cost of the entire logistics supply chain declined by nearly 4 points of GDP.

"By either measure, we are talking about major improvements in productivity," says Delaney. "After adjusting for inflation and interest rates, it is conservative to say that productivity has improved by $100 billion over this period."

Delaney's research shows a direct relationship between logistics performance and producer and consumer prices. For example, the Commerce Department index for finished goods producer prices inflated more than six percent between 1973 and 1981. Likewise, logistics costs inflated during this time due to economic regulation and overcapacity.

Partial deregulation kicked in during 1982. It stimulated competition and caused a shakeout of overcapacity in our logistics system between 1982 and 1987.

"We had real distribution cost reductions of $65 billion during that five-year period," Delaney says. "During this same five-year period the producer price index inflated only 1.2 percent. Obviously, there is a connection."

Logistics and distribution productivity plateaued between 1987 and 1990 while the producer price index increased by five percent. "Policies and programs that encourage logistics productivity reduce inflation," says Delaney.

PHYSICAL DISTRIBUTION & LOGISTICS COSTS

Relation to the Economy

Years	PD Costs/ GNP	Logistics Supply Chain/GDP
1978-1980	14.00%	16.30%
1988-1990	11.00%	12.40%
1991	10.30%	11.60%

Source: Robert Delaney, Cass Logistics

A Key Ratio: Inventory

The main focus of Delaney's research is on inventory. "After all, inventory is the primary responsibility of logistics managers," he says.

One of the key ratios Delaney watches to judge the effectiveness of inventory management by logistics professionals is the inventory-to-gross domestic product ratio.

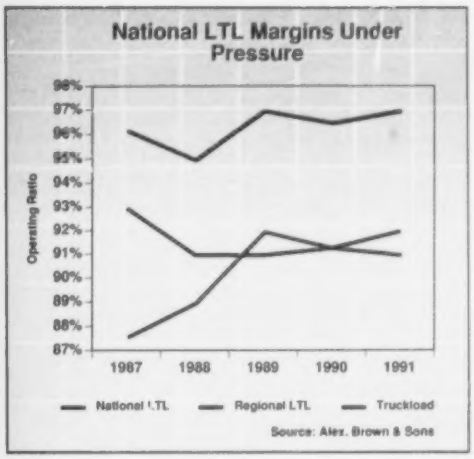
This ratio peaked to 29 percent during the recession of 1974-1975 and again in 1980. Delaney says most economists assume inventories will rise in recessions because sales fall faster than manufacturers can control their production.

But inventory declined during the 1981-82 recession and declined again in the current recession of 1990-91. The average investment in inventory declined month over month through most of 1991. "The reductions in inventory during the 1981-82 and 1990-91 downturns never happened before in our economy," says Delaney.

The reason inventory has fallenin the last two recessions? Better logistics management. "Our transportation industry has become more efficient, more reliable and much more service-intensive," says Delaney. "That has enabled logistics managers to invest in less inventory and hold it in fewer locations. In addition to more efficient delivery, the systems that are employed to forecast inventory are far more powerful. The communications links between manufacturers, wholesalers and retailers enable rapid replenishment."

Delaney attributes a good deal of the savings in logistics costs and improved logistics capability to partial transportation deregulation. He is especially eager to point out that deregulation has benefitted all shippers—large and small.

He examined the freight discounts received by Cass Logistics' 25 largest and 25 smallest shipper clients. He defined large shippers as those with freight costs of $10 million to $150 million, and small shippers as those with costs of under $1 million. Delaney says he reviewed the pricing for the Big Three LTL carriers and found that large shippers have discounts about 10 percent greater than small shippers. "That relationship is both fair and reasonable considering the economies of scale and competitive conditions," says Delaney. "Small shippers never had rates this favorable compared to big shippers prior to 1980. Competition is, and always will be, the best regulator." ■



With margins eroding, LTL carriers will be hard pressed to replenish assets.

Rough Going For LTL Carriers

Revenue was flat, profits down for this segment. But carriers are optimistic that if rates continue to firm, and tonnage improves, they can do an about-face in 1992.

By Thomas A. Foster, Editorial Director

With the recession in full swing at the beginning of 1991, everyone expected LTL carriers to make a poor showing. They probably did not expect these carriers to have their worst year since the last recession ended in 1982.

But that is what happened, according to financial data DISTRIBUTION tracks for the nation's 42 largest LTL carriers, which account for $15 billion of the total $18 billion in U.S. LTL revenue.

Revenue for these carriers climbed a meager 2.83 percent, but profitability dropped significantly. Operating ratios for the group rose an average of 1.5 points. More significantly, the industry's net income went from $423 million in 1990 to an anemic $237 million in 1991.

continued

NATIONAL LTL CARRIERS—1991 vs. 1990 (Millions of Dollars)

Rank	Carrier	1991 Revenue	1990 Revenue	% Change	1991 NI	1990 NI	% Change	1991 OR	1990 OR	Change
1.	Yellow Freight	$2,323.29	$2,278.54	+1.96	$8.80	$110.15	-92.01	98.9	94.5	-4.4
2.	CF MotorFreight	2,045.25	2,080.78	-1.71	18.74	53.27	-64.82	97.7	95.2	-2.5
3.	Roadway Express	2,041.31	1,965.20	+3.87	64.32	58.69	+9.59	98.9	94.1	-4.8
4.	Overnite Transportation	799.77	801.83	-0.26	33.46	54.54	-38.65	95.0	90.6	-4.4
5.	ABF Freight System	783.02	750.89	+4.28	(2.95)	1.10	NM	96.3	95.1	-1.2
6.	Carolina Freight Carriers	583.59	572.22	+1.99	0.65	0.84	-22.62	98.6	98.4	-0.2
	Totals or Averages	$8,576.23	$8,449.46	+1.50	$123.02	$278.59	-55.84	97.6	94.7	-2.9

Key: NI = net income; OR = operating ratio; NM = not meaningful
Source: ICC

INTERREGIONAL LTL CARRIERS—1991 vs. 1990 (Millions of Dollars)

Rank	Carrier	1991 Revenue	1990 Revenue	% Change	1991 NI	1990 NI	% Change	1991 OR	1990 OR	Change
1.	Conway Transportation	$534.50	$484.84	+10.24	$23.13	$29.93	-22.72	92.4	88.8	-3.6
2.	Preston Trucking	414.14	404.56	+2.37	(5.95)	0.77	NM	100.8	98.6	-2.2
3.	Central Transport	302.07	265.26	+13.88	1.70	(0.72)	NM	98.2	99.6	+1.4
4.	Watkins Motor Lines	269.05	248.03	+8.47	6.30	6.30	0	94.3	93.8	-0.5
5.	NW Transport	258.84	223.05	+16.05	6.40	11.58	-44.73	94.8	92.0	-2.8
6.	Churchill Truck Line	164.99	161.00	+2.48	(0.65)	2.35	NM	100.6	98.0	-2.6
7.	Old Dominion Freight Lines	155.86	147.32	+5.80	0.16	4.38	-96.35	91.5	92.6	+1.1
8.	FFE Transportation	139.93	130.91	+6.89	5.35	1.44	+271.53	94.2	97.9	+3.7
9.	ANR Freight System	123.44	169.03	-26.97	(25.15)	(50.74)	NM	125.3	140.9	+15.6
	Totals or Averages	$2,362.82	$2,234.00	+5.77	$11.29	$5.29	+113.42	99.1	100.2	+1.1

Key: NI = net income; OR = operating ratio; NM = not meaningful
Source: ICC

The six national carriers increased revenues by 1.5 percent, but they also saw an erosion of operating margins to just 2.3 percent. Net income dropped by more than half.

Regional carriers enjoyed slightly better revenue growth of 4 percent. Certain areas of the country, especially the Northeast, experienced much worse results. Revenues in the Northeast barely moved up, while operating ratios rose by an average of 1.8 percent and net income fell for most carriers. All but one carrier in the region suffered a decline in net income or a loss causing a year-to-year swing of $17 million.

Regional carriers in the Midwest experienced the largest percentage increase in revenue of 10.21 percent. However their net income dropped nearly 17 percent and operating ratios rose an average of 1.7 points.

In the West, revenue increased a modest 3.04 percent. Net income was down over 8 percent and operating ratios rose 2.3 points. Margins in the West, however, averaged 5.3 percent, which was the best profit performance among all the LTL regions. In the South and South Central U.S., revenues climbed less than 3 percent. Net income fell by nearly 40 percent and operating ratios went up 1.7 percent.

DISTRIBUTION groups more than a dozen large, but non-national LTL carriers with substantial operations in more than one region as inter-regionals. Performance among this diverse group varied widely, but average revenue growth was more than 5 percent. This inter-regional group was the only one to see an increase in net income and operating income.

As disappointing as 1991 was for the LTL industry, it could have been much worse. Stephen Klein, of Standard & Poor's, says the LTL industry emerged from the latest recession relatively unscathed compared with

continued

NORTHEAST/MIDDLE ATLANTIC LTL CARRIERS – 1991 vs. 1990
(Millions of Dollars)

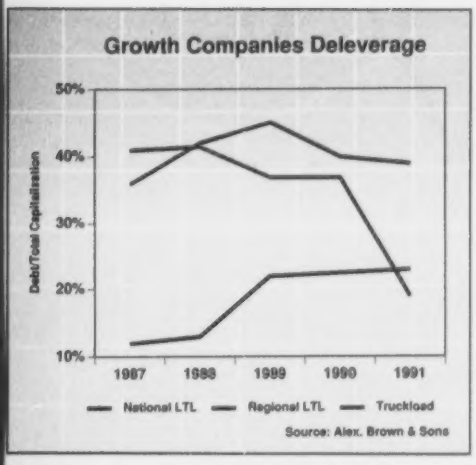
Rank	Carrier	1991 Revenue	1990 Revenue	% of Change	1991 NI	1990 NI	% of Change	1991 OR	1990 OR	% of Change
1.	St. Johnsbury Trucking	$304.72	$331.88	-8.18	($6.58)	$5.44	NM	100.5	95.1	-5.4
2.	TNT Red Star Express	170.56	158.87	+7.36	(0.28)	2.12	NM	100.1	97.4	-2.7
3.	APA Transport	138.00	142.11	-2.89	5.84	8.60	-32.09	94.4	92.3	-2.1
4.	New Penn Motor Express	129.62	125.03	+3.67	20.54	19.21	+6.92	79.7	79.3	-0.4
5.	Estes Express Lines	111.66	96.86	+15.28	10.59	9.78	+8.28	84.8	84.1	-0.7
6.	Wilson Trucking	59.03	59.63	-1.01	2.02	2.76	-26.81	95.0	92.8	-2.2
7.	New England Motor Freight	60.03	58.86	+1.99	NA	1.80	NM	98.5	96.9	-1.6
8.	Pitt-Ohio Express	45.13	36.41	+23.95	7.73	6.29	+22.94	82.8	82.7	-0.11
9.	CBL Trucking	30.57	30.00	+1.91	(0.09)	0.23	NM	99.1	98.1	-1.01
	Totals or Averages	$1,049.32	$1,039.65	+0.93	39.77)	$56.23	-29.27	92.8	91.0	-1.8

Key: NI = net income; OR = operating ratio; NM = not meaningful; NA = not available
Source: ICC

MIDWEST LTL CARRIERS – 1991 vs. 1990
(Millions of Dollars)

Rank	Carrier	1991 Revenue	1990 Revenue	% Change	1991 NI	1990 NI	% Change	1991 OR	1990 OR	Change
1.	TNT Holland	$283.46	$250.87	+12.99	$15.22	$16.89	-9.89	91.0	88.8	-2.2
2.	Arkansas Freightways	198.46	142.95	+38.83	7.78	7.00	+11.14	92.7	90.4	-2.3
3.	Advance Transportation	119.79	114.32	+4.78	0.11	0.91	-87.91	98.1	97.0	-1.1
4.	Hyman Freightways	104.26	103.64	+0.60	0.31	0.25	+24.00	98.9	99.0	+0.1
5.	Fore Way Express	65.76	67.48	-2.55	0.20	0.21	-4.76	99.7	99.7	0
6.	Crouse Cartage	63.45	61.17	+3.73	2.72	1.65	+64.85	95.9	95.3	-0.6
7.	BeMac Transport	54.83	52.92	+3.61	(2.29)	(1.09)	NM	101.2	99.2	-2.0
8.	Jones Transfer	50.43	59.98	-15.92	(3.78)	(1.46)	NM	105.0	99.8	-5.2
	Totals or Averages	$940.44	$853.33	+10.21	$20.27	$24.36	-16.79	97.8	96.2	-1.7

Key: NI = net income; OR = operating ratio; NM = not meaningful
Source: ICC



Regional LTL carriers have done the best job of cleaning up their balance sheets.

the downturn from 1979-1982, when industrial output slid 4.4 percent but LTL volume dropped 28.8 percent. During that recession, freight shifted from unionized LTL carriers to TL carriers. In this recession, TL took only about 2 percent of LTL traffic. Excluding this TL diversion, LTL cargo advanced 1.5 percent in 1991.

Relative Calm

Relative calm has been restored to the LTL segment, in part because of the massive consolidation of carriers that has taken place. The three largest LTL carriers now command 37 percent of the market. Before 1980, they had only 15 percent.

Evidence of this calm is the relatively small number of LTL bankruptcies in 1991. Only one major carrier—Jones Truck Lines—went bankrupt in 1991. A smaller Northeast carrier, North Penn Transfer, also went out of business, but only after the Teamsters refused to accept a cut in wages.

The calm may not last. Klein sees consolidation of regional carriers continuing at a rapid clip until a handful of carriers dominate each of the short-haul markets. "While some independent regional carriers will move to the top of the heap, most of the dominant regional lines will be affiliates of the major transcontinental lines," he says.

John G. Larkin, vice president with Alex. Brown & Sons in Baltimore, is more optimistic about the future of regional carriers. He says the performance gap between the national and regional/inter-regional carriers is widening, with the regionals coming out ahead. Tonnage growth is the main difference. Nationwide operators like CF MotorFreight, Roadway Express, Yellow Freight and Carolina Freight are experiencing only modest, 2-3 percent year-over-year changes in tonnage.

continued

SOUTHEAST & SOUTH CENTRAL LTL — 1991 vs. 1990
(Millions of Dollars)

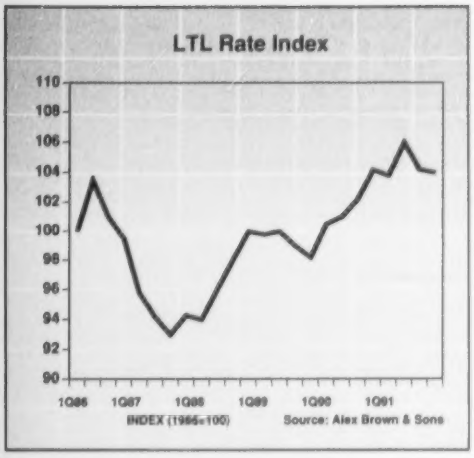
Rank	Carrier	1991 Revenue	1990 Revenue	% of Change	1991 NI	1990 NI	% of Change	1991 OR	1990 OR	% of Change
1.	Central Freight Lines	$219.56	$226.42	-3.03	$2.07	$5.38	-61.52	97.4	96.5	-0.9
2.	AAA Cooper Transportation	166.89	157.86	+5.72	7.46	9.90	-24.65	91.1	89.4	-1.7
3.	Southeastern Freight Lines	159.96	154.42	+3.59	11.70	14.41	-18.81	92.4	90.6	-1.8
4.	Averitt Express	164.00	142.66	+14.96	5.21	3.64	+43.13	93.4	93.9	+0.5
5.	Merchants Fast Motor Lines	105.29	102.93	+2.29	(0.03)	0.53	NM	99.3	98.9	-0.4
6.	Saia Motor Freight Lines	109.40	102.55	+6.68	4.69	5.40	-13.15	89.1	86.1	-3.0
7.	Transus Inc.	81.21	80.37	+1.05	(0.96)	1.17	NM	101.7	98.7	-3.0
8.	Spartan Express	89.49	78.60	+13.85	(5.50)	(3.49)	NM	107.0	104.3	-2.7
9.	Standard Trucking	60.09	58.47	+2.77	(0.15)	0.41	NM	99.4	97.5	-1.9
10.	Armellini Express Lines	49.50	51.06	-3.06	0.02	0.08	-68.00	98.4	96.7	-1.7
11.	Southwestern Motor Transport	56.36	57.87	-2.61	0.64	0.91	-29.67	98.2	97.6	-0.6
12.	Smalley Transportation	41.19	51.97	-20.74	(2.78)	(1.12)	NM	103.7	100.6	-3.1
	Totals or Averages	$1,302.94	$1,265.18	+2.98	$22.37	$37.22	-39.89	97.6	95.9	-1.7

Key: NI = net income; OR = operating ratio; NM = not meaningful
Source: ICC

WESTERN & ROCKY MOUNTAIN LTL CARRIERS—1991 vs. 1990
(Millions of Dollars)

Rank	Carrier	1991 Revenue	1990 Revenue	% of Change	1991 NI	1990 NI	% of Change	1991 OR	1990 OR	% of Change
1.	Viking Freight Systems	$233.75	$223.95	+4.38	$8.39	$9.08	-7.60	93.7	90.8	-2.9
2.	G.I. Trucking	103.33	103.82	-0.47	0.13	1.57	-91.72	97.3	94.7	-2.6
3.	Willig Freight Lines	75.19	81.37	-7.59	(1.80)	0.20	NM	99.9	95.6	-4.3
4.	TNT Reddaway Truck Line	61.61	50.98	+20.86	4.00	3.44	+16.12	88.6	88.1	+3.44
5.	TNT Bestway Transportation	59.73	60.40	-1.11	5.21	3.64	+43.13	93.4	93.9	+0.5
6.	Motor Cargo	51.85	49.07	+5.67	2.31	1.88	+22.87	94.5	91.9	-2.6
7.	Lynden Transport	49.54	46.69	+6.09	2.04	2.30	-11.17	95.6	92.3	-3.3
	Totals or Averages	$635.00	$616.28	+3.04	$20.28	$22.11	-8.29	94.7	92.5	-2.3

Key: NI = net income; OR = operating ratio; NM = not meaningful
Source: ICC



Rates held up well except in areas battered by recession or excess capacity.

Larkin says the regional/inter-regional carriers are doing better as the modest recovery unfolds. "As shippers opt for faster delivery times, the regional distribution expertise and lower cost structure that regional carriers offer make the future bright for these carriers," Larkin says. "Tonnage year-to-date for some regionals was up 10 to 25 percent over last year."

Both analysts agree that the financial outlook is improving for all LTL carriers. Klein says excess capacity has been wrung out the system. "With fewer idle rigs and employees, carriers can afford to turn away unprofitable freight," he says. "Rates are already beginning to firm."

Larkin says prices should remain firm as long as the large carriers avoid the temptation to cut rates aggressively. "Since the April 1 Teamsters pay increase left only a small portion of the January 1 rate increase on the table to help battered margins," says Larkin, "we see no reason for a price-driven market share battle in the near future."

Among the regional carriers, Larkin says rates remain highly unstable. "Where the economic rebound has been slow to materialize or where overcapacity exists, especially in the Northeast and in California, intense rate competition continues relentlessly," says Larkin.

There is sufficient competition to keep LTL rates from rising significantly short-term. Klein sees revenue per ton increasing about 3 percent in 1992—twice the amount in 1991 and the strongest gain since 1986. Rates per ton have fallen 20.3 percent since 1983. Also, LTL volume should post a 3.5 percent gain in 1992.

LTL carriers are trying to wean shippers away from rate discounting. Most carriers took rate hikes in January of 4 to 5 percent, and pledged to make it the only increase of the year. Presumably, this tactic will help shippers budget their transportation costs better, and carriers will save money because they will not have to revise tariffs as often. ■

ANR LOOKS TO CONTINUE ITS TURNAROUND

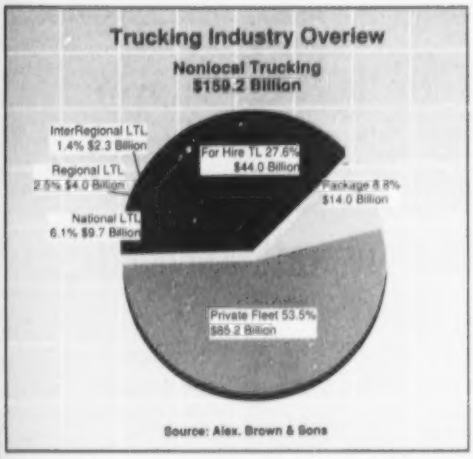
The honors for most improved financial performance in the LTL industry have to go to ANR Freight System. This choice may seem unlikely for a carrier that suffered a year-to-year revenue drop of 27 percent and a net loss of $25 million in 1991, but look at the positive side: ANR's operating ratio improved from 140 in 1990 to 125 in 1991.

According ANR's Executive Vice President and CEO, Larry Jouett, ANR has recorded seven consecutive quarters of revenue and operating improvement. "Our account base has grown by approximately 10 percent as customers discover our service performance and give us a try. That's why we are a growing carrier," he says.

Clearly ANR has come a long way since May of 1990, when the then-national LTL carrier decided the only way to survive was to downsize to a regional carrier. In a matter of months, ANR closed scores of terminals and laid off hundreds of employees. The cost to implement this downsizing accounted for the operating ratio of 140 in 1990. ANR's new operating area was limited to the Great Lakes states and several points in Texas and on the West Coast.

The downsizing appears to be having the desired effect. Fourth quarter 1991 revenue per workday increased by 7.3 percent over the third quarter and 17.3 percent over the same quarter of the prior year. ANR's fourth quarter operating ratio improved by 4.6 percentage points compared with the third quarter and 24.7 points compared with the prior year's fourth quarter.

ANR could become the only major carrier to survive such a radical restructuring, thanks to the financial commitment of its parent, $9 billion Coastal Corporation. With an operating ratio still well over 100, ANR is hardly out of the woods. Still, ANR's management is outspokenly confident that the turnaround will continue. "Some of our major terminals returned to profitability in May," says Jouett. "Most of our locations are hundreds of dollars a day away from enough top-line revenue to get into the black."



Truckload accounts for the second biggest piece of the trucking industry pie.

Truckload Returns to Stability

Massive investment and fierce competition led to overcapacity in the truckload business in the 1980s. The shoe could be on the other foot soon.

By Thomas A. Foster, Editorial Director

The truckload industry, at least the general commodity carriers, had a surprisingly good year in 1991 compared with other sectors of the trucking industry. With any significant improvement in the economy, the outlook for 1992 is even better.

Revenue for the 50 largest general commodity carriers tracked by DISTRIBUTION climbed an average of 10 percent. This group of carriers represents approximately half of the $16 billion dry van business. For the larger carriers in the Top 50, increases of 20 percent or more were common. Operating margins did not move for the entire group, and on average, provided the carrier with a gross margin of over four percent. Net income was a different story. The TL group, which tends to be highly leveraged with debt, fell further into the red after paying its huge interest costs and went from a loss of $7.5 million in 1990 to a loss of $45 million in 1991.

The tank truck carrier industry, based on the 12 leading carriers that DISTRIBUTION tracks, experienced modest revenue gains of nearly 4 percent and virtually no improvement in operating margins. Average operating margin was less than 4 percent. Net income plummeted 92 percent from $207 million in 1990 to a total of $15 million in 1991.

The 15 major household goods carriers tracked by DISTRIBUTION saw their revenues fall by 3 percent in 1991, no doubt because the recession slowed corporate relocations considerably. Operating margins remained extremely thin, averaging less than 2 percent. Surprisingly, net income performance improved by over 300 percent for the group. HHG carriers obviously have learned how to control expenses in bad times.

According to John Larkin, a trucking analyst with Alex. Brown & Sons in Baltimore, the dry van general commodity carriers are not only the largest single part of the $44 billion for-hire truckload market with 40 percent of the total revenue, but it is also where the most interesting action is in the TL industry.

Carriers in this sector are just getting over a slump caused by four or five years of overcapacity. They are now poised for dramatic change. Larkin sees six trends reshaping the TL sector:

- Further rationalization of the long-haul TL sector because of reduced access to capital and competition for qualified drivers
- Increased cooperation of long-haul TL carriers with the railroads
- Greater interest in the short-haul market
- Greater emphasis on providing dedicated contract carriage
- Diversification into niche markets
- More international activity as the North American Free Trade Agreement increases demand for TL services.

The long-haul generic market is beginning to revive, says Larkin, but rationalization is still going on. This sector attracted what Larkin calls "massive injections of capital" dur-

continued

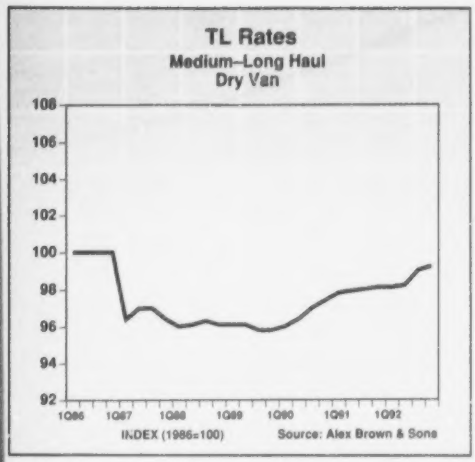
ing the 1980s. "We ended up with too much TL capacity in the long-haul generic markets because of these investments," says Larkin. At the same time this capital was coming into the long-haul TL markets, he explains, steamship operators were trying to find ways to move imports and exports more efficiently. They came up with the stacktrain, which created even more capacity for low-cost, long-haul movement of generic TL traffic. Stacktrain capacity was concentrated in lanes already satu-

continued

TOP 50 GENERAL COMMODITY TL CARRIERS—1991 vs. 1990 (Millions of Dollars)

Rank	Carrier	Type	1991 Revenue	1990 Revenue	% of Change	1991 NI	1990 NI	% of Change	1991 OR	1990 OR	% of Change
1.	Schneider National	V,B,FB	$908.00	$796.36	+14.02	NA	NA	NA	NA	NA	NA
2.	J.B. Hunt Transportation	V,FB	732.61	579.83	+26.35	29.98	30.05	-0.23	91.80	90.20	-1.60
3.	Ryder Distribution	V	379.23	314.73	+20.49	5.53	6.09	-9.32	97.18	96.40	-0.78
4.	Werner Enterprises	V	322.83	305.13	+5.80	19.69	18.01	+9.28	89.50	89.20	-0.30
5.	Builders Transport	V,FB	212.37	240.76	-11.79	(3.54)	(10.70)	NM	96.40	97.40	+1.00
6.	Burlington Motor Carriers	V	249.52	235.23	+6.07	NA	NA	NA	95.90	94.50	-1.40
7.	Ranger Transportation	V	248.53	236.85	+4.93	4.15	0.24	1629.17	96.30	97.10	+0.80
8.	MNX	V	288.66	198.92	+45.11	1.66	0.22	+654.55	98.10	98.20	+0.10
9.	CRST International	V,FB	216.37	182.71	+18.42	NA	NA	NA	95.80	96.30	+0.50
10.	Swift	V	190.68	156.33	+21.97	6.47	6.66	-2.91	93.10	90.10	-3.00
11.	Signal Delivery Service	V	171.49	211.59	-18.95	(2.11)	(0.31)	NM	97.50	96.10	-1.40
12.	Independent Freightways	V	158.66	154.88	+2.44	2.94	0.25	1095.12	95.80	96.10	+0.30
13.	M.S. Carriers	V	152.57	123.56	+23.46	7.76	6.38	+21.59	89.90	89.40	-0.50
14.	Crete Carriers	V	152.48	131.37	+16.07	10.78	7.57	+42.40	93.00	94.60	+1.60
15.	Contract Freighters	V	140.03	119.86	+16.82	9.43	10.75	-12.26	89.58	87.50	-2.08
16.	KLLM Inc.	R,V	129.57	125.76	+3.03	2.82	2.77	+1.88	93.20	92.70	-0.50
17.	Tri-State Motor Transit	V	126.26	117.35	+7.59	(0.16)	0.91	NM	96.50	95.10	-1.40
18.	C.R. England & Sons	R,V	122.16	97.19	+25.70	5.63	3.73	+50.83	92.60	92.60	0.00
19.	Anderson Trucking	V	119.47	113.20	+5.54	1.77	2.33	-23.99	97.30	95.20	-2.10
20.	New Prime	V	118.78	98.63	+20.43	6.58	3.43	+92.01	90.80	92.60	+1.80
21.	Universal Am-Can	V	111.96	105.81	+5.82	(172.00)	0.43	NM	99.60	98.70	-0.90
22.	National Freight	V	105.07	118.18	-11.09	(2.86)	(10.91)	NM	99.60	106.60	+7.00
23.	Munson Transportation	V	104.46	107.85	-3.15	(0.50)	(0.68)	NM	95.30	95.70	+0.40
24.	Dart Transit	V	104.28	97.21	+7.27	1.68	2.89	-41.87	96.70	95.10	-1.60
25.	Poole Truck Line	V	101.73	110.73	-8.13	(4.53)	2.66	NM	99.80	96.70	-3.10
26.	Ligon Nationwide	FB,V	101.32	104.86	-3.37	0.44	0.01	6214.29	97.00	97.70	+0.70
27.	Mercer Transportation	V	100.56	88.31	+13.88	3.95	3.33	+18.56	95.80	96.00	+0.20
28.	Ace Transportation	V	91.02	134.06	-32.11	0.79	1.04	-24.42	99.30	96.10	-3.20
29.	Freymiller Trucking	R,V	92.36	86.09	+7.28	(1.49)	2.05	NM	97.70	90.60	-7.10
30.	Marten Transport	V	87.76	81.35	+7.88	3.45	1.79	+92.63	93.45	93.40	-0.05
31.	Midwest Coast Transport	V,R	82.83	79.26	+4.50	1.90	1.54	+23.49	94.30	96.30	+2.00
32.	Robertson (PFT/CX)	V,FB	80.05	83.72	-4.37	1.43	1.76	-18.67	97.50	97.90	+0.40
33.	Roadrunner Trucking	V	80.02	82.79	-3.35	0.96	0.96	0.10	98.40	96.00	-2.40
34.	National Carriers	R,V	75.88	76.25	-0.49	0.59	1.55	-61.81	97.10	95.80	-1.30
35.	Heartland Express	V	73.80	62.81	+17.49	2.23	1.22	+82.87	95.30	97.40	+2.10
36.	U.S. Express	V	73.47	54.42	+35.00	2.15	NA	NA	88.00	91.20	+3.20
37.	American President Trucking	C,V	72.57	53.06	+36.77	(5.54)	(6.25)	NM	99.10	112.00	+12.90
38.	Jack Gray Transport	V	71.36	74.53	-4.26	1.85	3.27	-43.34	98.00	97.00	-1.00
39.	Willis Shaw Express	V,R	67.33	63.83	+5.47	5.13	2.58	+98.64	90.20	90.60	+0.40
40.	PAM	V	65.72	57.69	+13.92	(2.95)	(17.73)	NM	101.80	97.30	-4.50
41.	Southwest Motor Freight	V	64.66	58.98	+9.62	2.70	(2.34)	NM	92.60	99.90	+7.30
42.	Acme Truck Line	V	58.91	61.44	-4.11	0.39	1.47	-73.85	99.10	97.30	-1.80
43.	Shaffer Trucking	V	58.72	49.55	+18.50	5.55	4.54	+22.24	91.40	92.20	+0.80
44.	Alterman Transport	V,R	58.20	58.62	-0.71	(0.67)	1.81	NM	98.40	100.00	+1.60
45.	Savage Industries	V,FB	56.76	47.32	+19.95	0.54	1.97	-72.61	97.60	94.20	-3.40
46.	McClendon Trucking	V	54.08	50.06	+8.05	3.34	3.17	+5.20	90.60	91.80	+1.20
47.	Deaton Inc.	V	50.80	52.61	-3.44	(1.32)	(0.35)	NM	100.00	99.50	-0.50
48.	T.L.C. Lines	V	50.60	50.65	-0.10	(0.35)	0.13	NM	98.50	98.10	-0.40
49.	Jones Motor	V,FB	50.43	59.98	-15.92	(3.78)	(1.46)	NM	105.00	99.80	-5.20
50.	Eck Miller Transportation	V	46.02	49.39	-6.07	2.16	1.67	+29.16	94.90	96.70	+1.80
	Totals or Averages		$7,432.97	$6,801.26	+9.29	($45.40)	($7.52)	NM	95.76	95.69	+0.07

Key: NI = net income; OR = operating ratio; NA = not available; NM = not meaningful; V = dry van; R = reefer or temperature controlled; FB = flat bed; B = bulk; C = container chassis
Source: ICC and individual carriers



Shippers shared the pain of recession by resisting TL rate increases. That could change soon.

rated with efficient TL carriers.

"This put a squeeze on margins in these lanes and essentially cut off the flow of capital in this industry," says Larkin. "It has taken 3-4 years for this part of the industry to rationalize. With the cessation of capital inflows to this segment and with the pricing and capacity discipline that has been exercised by the larger carriers, we should have financial stability returning to the TL sector."

However, as these carriers require more capital to replace equipment and invest in terminals, technology and people, only the healthy ones will have access to funds.

"Banks are much less willing to lend money to weak carriers," says Larkin. Insurance companies are also being much more selective. "All of these factors make it difficult for weaker carriers to survive, much less prosper," says Larkin. "The economic downturn has further squeezed marginal carriers. If 20 carriers serve a particular shipper and that shipper's business drops by 10 percent, carriers 19 and 20 on the depth chart will end up getting pushed off the edge of the cliff."

These weaker carriers will soon find out how scarce investment capital is, as tougher environmental laws and technology advances force them to upgrade equipment. At an Alex. Brown seminar held earlier this year in New York, Kirk Thompson, president and CEO of J.B. Hunt Transport Services pointed out that diesel engine smoke flunked air quality tests in California. "There is going to be a need for significant investment in new equipment to meet the higher environmental standards, and this alone will force more consolidation."

Smaller carriers are also being squeezed by the worsening driver shortage. All TL carriers face an already shrinking pool of quality drivers whittled down by tougher licensing requirements and drug testing.

"These drivers want to work for the top carriers," Larkin says. "They are looking for stability. They want good, solid pay and benefits. They like to drive nice, clean late-model trucks. Carriers that have succesfully managed the process of driver recruitment and retention are poised for success in the 1990s."

Truckload carriers are developing strategies to deal with the worsening driver shortage, according to leading trucking CEOs. Swift Transportation has started a driver's school of its own, coordinated its dispatching to get drivers home more often and increased drivers' pay, says CEO Jerry Moyes. "Since we have reduced driver turnover from 118 percent to 80 percent, we have also seen our accident rate, and our insurance costs, go down," he says.

Mike Starnes, president and CEO of M.S. Carriers, says he raised driver pay by 29 percent in 1990 to get the

continued

TOP 12 TANK TRUCK CARRIERS—1991 vs. 1990
(Millions of Dollars)

Rank	Carrier	1991 Revenue	1990 Revenue	% of Change	1991 NI	1990 NI	% of Change	1991 OR	1990 OR	% of Change
1.	Chemical Leaman Tank Line	$222.74	$231.35	-3.72	$0.44	$0.43	+2.10	97.5	97.4	-0.1
2.	Bulk Materials	221.60	261.60	-15.29	NA	NA	NA	NA	NA	NA
3.	Matlack, Inc.	191.86	216.88	-11.54	(3.02)	0.67	NM	99.4	96.6	-2.8
4.	Montgomery Tank Lines	132.44	126.56	+4.56	2.01	2.08	-3.27	91.5	91.1	-0.4
5.	Trimac Transport	92.67	98.01	-5.45	1.26	0.15	+752.70	95.4	97.6	+2.2
6.	Groendyke Transport	89.58	84.46	+6.06	1.42	2.10	-32.52	96.5	95.8	-0.7
7.	DSI Transport	80.53	76.49	+5.28	4.26	3.81	+11.81	91.3	91.6	+0.3
8.	Miller Transporters	72.38	75.93	-4.68	0.01	(0.22)	NM	98.4	98.2	-0.2
9.	Central Transport	60.09	57.53	+4.45	(0.15)	NA	NM	99.4	95.8	-3.6
10.	Jack B. Kelley Inc.	52.58	57.38	-8.36	(0.44)	197.00	NM	100.5	99.3	-1.2
11.	Bikmatic Transport	50.75	46.10	+10.07	1.06	0.64	+66.14	95.1	94.5	-0.6
12.	McKenzie Tank Lines	41.19	49.43	-16.66	3.49	NA	NM	95.0	99.5	+4.5
	Totals or Averages	$1,308.40	$1,381.72	-5.31	$10.34	$206.66	-95.00	96.4	96.1	+0.1

Key: NI = net income; OR = operating ratio; NA = not available; NM = not meaningful
Source: ICC

best drivers. His drivers now start out at 26 cents a mile and get a one cent per mile raise with each year of service until they cap out at 30 cents.

"Our goal for turnover is 50 percent," says Starnes, who pegs current turnover at 80 percent. "Even our marketing efforts are tied into this goal. We are looking for driver-friendly freight that will get the drivers home more often."

One answer to the driver shortage for certain movements is to put long-haul freight on the rails. Larkin says long-haul carriers are pressing major railroads for marketing and operating agreements that establish intermodal partnerships.

"For many years, rail intermodal was not used by the TL carriers because service quality was poor and shippers simply did not want their freight moved on the rails. Most of these perceptions have finally changed," says Larkin.

Short-Haul Is Hot

One of the hottest segments in truckload is the short-haul market. This sector has been slower to grow because less capital has flowed into it, and also because it is much more complicated. "To be successful in this market, operators must be able to load and dispatch each truck one or more times a day," says Larkin. "Only a few carriers have the high quality loading, operating and management control systems to keep trucks loaded."

He says the successful carriers in this segment such as Heartland and M.S. Carriers have traditionally enjoyed wider margins than the carriers in the longer haul segments. "These margins may not last forever because more and more carriers will grow into the short-haul markets," says Larkin. "The market under 600 miles provides ample room for growth."

Another big opportunity lies in dedicated contract carriage. Mike Starnes says dedicated carriage is ideal for TL carriers such as his that have the capability to handle large volumes of short-haul traffic. "We have to be much more aggressive if we are to capture this business, which is still dominated by the leasing companies," says Starnes. "TL carriers have an important advantage because we can fill the empty miles. A leasing company cannot. But we have to sell this message."

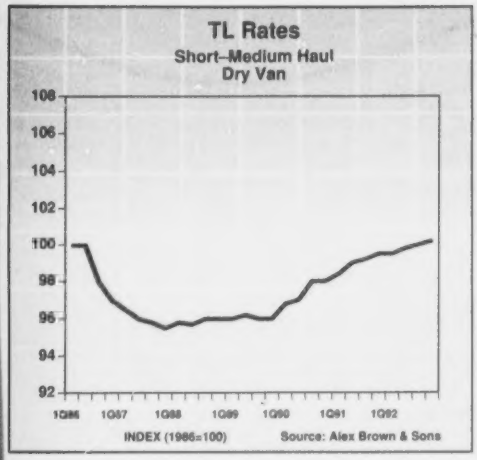
The North American Free Trade

continued

HOUSEHOLD GOODS CARRIERS—1991 vs. 1990
(Millions of Dollars)

Rank	Carrier	1991 Total Gross Trucking Revenue	1990 Total Gross Trucking Revenue	% of Change	1991 NI	1990 NI	% of Change	1991 OR	1990 OR	% of Change
1.	North American Van Lines	$752.61	$775.65	-2.97	$2.07	($9.05)	-122.87	97.4	99.6	+2.2
2.	United Van Lines	474.91	473.50	+0.30	7.46	0.51	+1362.75	91.1	98.6	+7.5
3.	Allied Van Lines	377.11	398.58	-5.39	11.70	1.95	+500.00	92.4	99.0	+6.6
4.	Mayflower Transit	279.14	310.48	-10.09	5.21	2.58	+101.94	93.4	93.1	-0.3
5.	Atlas Van Lines	212.39	216.68	-1.98	(0.03)	3.19	NM	99.3	98.0	-1.3
6.	Bekins Van Lines	190.55	212.70	-10.42	4.69	1.19	+294.12	89.1	97.6	+8.5
7.	Graebel Van Lines	99.36	96.76	+2.69	(0.96)	1.83	NM	101.7	96.7	-5.0
8.	Burnham Services	89.01	92.51	-3.79	(5.50)	0.19	NM	107.0	98.2	-8.8
9.	Paul Arpin Van Lines	65.40	55.47	+17.91	0.02	0.09	-73.33	98.4	100.3	+1.9
10.	Global Van Lines	62.33	56.87	+9.59	(0.15)	0.54	NM	99.4	99.0	-0.4
11.	Wheaton Van Lines	42.93	47.79	-10.17	0.30	0.09	+243.18	98.2	94.0	-4.2
12.	New World Van Lines	40.91	40.90	+0.02	2.09	2.10	-0.67	103.7	97.9	-5.8
13.	National Van Lines	32.33	32.68	-1.07	0.01	0.21	-96.62	107.7	98.9	-8.8
14.	American Red Ball Van Lines	27.32	24.88	+9.80	0.44	0.17	+169.09	98.6	98.6	0.0
15.	Interstate Van Lines	10.54	12.34	-14.64	0.66	0.76	-12.17	95.9	95.9	0.0
	Totals or Averages	$2,756.83	$2,847.79	-3.19	$28.02	$6.34	+342.24	98.2	97.7	-0.5

Revenue for four of the largest HHG carriers includes the following general freight revenue: North American, $213.91 million; United Van Lines, $16.14 million; Atlas Van Lines, $6.29 million and Bekins Van Lines, $9.6 million.
Key: NI = net income; OR = operating ratio; NM = not meaningful
Source: ICC and carrier reports



A driver-related capacity shortage could accelerate the timetable for TL rate hikes.

Agreement also presents tremendous opportunities for the TL carriers, says Larkin.

"We are going to see a tradeoff between transportation and manufacturing costs," says Larkin. "There is a shift of manufacturing from Canada to the U.S. and then down to Mexico. Manufacturers are trading off lower labor costs for higher transportation costs, and that increases demand for truckload services."

In the Driver's Seat

For the first time since deregulation, truckload pricing power may soon be shifting to the carriers. Ironically, this shift is being caused by thin margins that have been whittled down to the point where carriers are barely able to earn a return on their invested capital. "Without adequate returns, companies cannot replace their assets, and ultimately they go out of business and capacity goes away," says Larkin. "The carriers that have survived have learned from past mistakes about capacity addition in bullish freight markets, which causes prices to remain flat. The days of 40-45 percent equipment additions per year are gone."

A rebound in the economy should help create a capacity shortage, says Larkin. "This shortage will be driver-related more than capital- and equipment-related," he says. "As the economy revives, other jobs will be created and that will make it tougher and tougher for TL carriers to find qualified drivers."

Larkin says the combination of these factors is contributing to a potential shortage of capacity that should, over time, permit TL carriers to raise their rates, albeit at a painfully slow rate. He sees annual rate increases for 1992 in a range from 1.5 to 4 percent, which is about what happened in 1991.

More importantly, Larkin says shippers' attitudes about rate increases are slowly changing. Says Larkin: "Enlightened shippers are willing to exchange higher rates over one to three years in exchange for guaranteed high-quality capacity commitments." ■

CFI SEEKS GROWTH BY CROSSING BORDERS

Contract Freighters Inc. reports that about half of its 1991 revenues of $140 million were derived from freight originating from or destined to points outside the U.S.—enough to make CFI the first trucking company ever to receive the President's "E" Award for export service excellence.

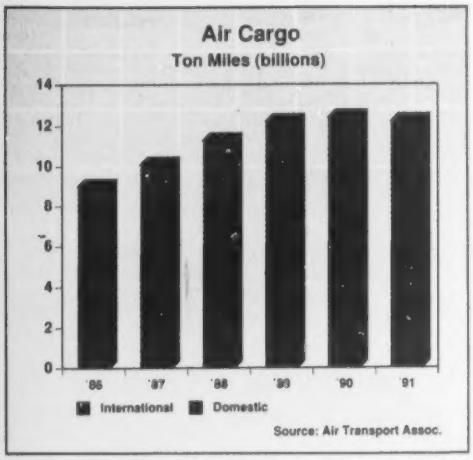
The Joplin, Mo.-based truckload carrier enjoys a particularly strong presence south of the border, where on any given day about 900 CFI trailers are in transit via the company's Mexican partners.

The company has been able to identify and team up with a core group of about 20 Mexican carriers driven to the high quality standards demanded by CFI's customers, which largely ship high-value, time-sensitive freight often used in just-in-time inventory control programs, says Glenn Brown, CFI president.

Brown says CFI's fleet of 3,500 air-ride trailers is a big plus for its Mexican customers. "Our customers experience virtually no damage to their cargo, which is important, given the infrastructure conditions in that country and the nature of the freight we handle—electronics, calibrated equipment and auto parts," he says.

Sales and customer service activities in Mexico are conducted in tandem with a crew of bi-lingual Mexican nationals employed by CFI. Home-grown software programs designed at CFI headquarters perform language translations for all necessary functions, from dispatch and operations to claims and accounting. All of the core carriers are linked to CFI via EDI. "Any customer who is on-line with CFI via EDI can access updated information with regard to the movement of their freight in all three countries," Brown says.

CFI has established growth objectives of 10 percent a year for the next five years. Brown predicts the majority of that growth will be in the international arena. In the past two years CFI has built new terminals in Dallas, El Paso and Laredo to facilitate anticipated growth in the transborder trade.



Domestic ton miles have remained steady since 1986.

Trends Bode Well For Air

Domestic U.S. and international airfreight markets are experiencing parallels. Though not as rapid as the trend of the 1980s, growth is expected in the market.

By E.J. Muller, Senior Editor

The airfreight market, which for all intents and purposes was born in this country at the time of deregulation, has emerged from its teen years. Explosive expansion has leveled off. Growth curves of 30 percent in cargo (by weight) will have receded to 7-8 percent. Developments won't be as rapid in the coming years as they were in the 1980s, but they will be steady and positive.

According to the Atlanta-based Colography Group, which every year produces an exhaustive analysis of worldwide airfreight markets, there are important parallels between the domestic U.S. and international airfreight markets. Shippers will use air service more frequently, but in smaller shipment sizes. This reflects a general business trend toward time-based management, in which logistics attempts to maintain a balanced flow between raw materials, in-process work, and finished goods distribution. If the size and price is right, airfreight has a prominent place in this strategy.

"What's become more important to shippers, both in the U.S. and abroad, is the guarantee of a time-definite service," says the Colography Group's Ted Scherck. "Shippers are learning when it is the correct time to use air, and they are planning accordingly." The trend toward more reliable delivery service, often deferred (three day service or more), rather than the speed of overnight, is continuing, he says.

Both domestically and internationally, package business of the 70 lbs. or less variety, is the fastest growing market segment. Last year saw a 9.8 percent rise in package traffic, as compared to 1.4 percent for envelopes and 2.2 percent for freight. Freight revenue growth, however, just edged out package revenue growth, 7.5 to 7.4 percent. Envelope revenue grew only .7 percent. While the latter number may not seem impressive, consider that many analysts had predicted a massive decline in envelope business with the advent of fax machines. That prediction has not happened.

The most significant trends in the domestic market, according to Scherck, are:

• The ruralization of freight service. More businesses are leaving metropolitan areas to relocate in outlying regions. They are in search of smaller, less volatile communities with eager workforces, where there is less union presence and the local governments will promise tax deferrals to create employment opportunities. A large Ohio-based toll maker, for example, will be shutting its aging urban plant, which would cost $100 million to retool. Instead, it will build four separate facilities around the country and shuttle production material via the domestic air network. Scherck believes this is a steadily progressing trend.

• The growth of package shipments. Again, a general business trend that bodes well for air service. As minimum order quantities fall due to the impact of inventory reduction strategies on purchasing patterns,

continued

shipment sizes will decrease, making air a more affordable alternative for companies seeking to level out production cycles.

• Time-definite service. Airfreight providers don't have to be superfast; they must be super-reliable. "On-time delivery has to be at least at the 95 percent level for a vendor to even be in the game anymore," says Scherck. It should be noted that these trends are in no way confined to airfreight. This is pretty much what's expected to affect truck, rail and ocean delivery as well.

Scherck's market analysis focuses mainly on the major integrated carriers: Airborne, Burlington Air Express, DHL, Emery Worldwide, Federal Express, UPS and the U.S. Postal Service (often overlooked, even though it's the largest carrier by volume). It is these seven companies that now control 90 percent of the domestic market for envelopes, packages and freight. Scherck expects to see this list diminish in the 1990s. "I think there may be two too many," he says, declining to speculate as to which may drop out. That may or may not happen. The deathwatch has been on these carriers for years, and they're still here.

One of the biggest developments of the past year, Federal Express' plan to move into UPS' ground service domain, didn't surprise Scherck at all. "Once these companies have met the capital investment requirement of this business, they are driven to push more units through their system. That's what Federal is doing." He doesn't think they'll lose money at it, either, even though they'll crack the market by initially flying freight at or near UPS ground rates. "Linehaul costs in the domestic market are not as significant to these companies as the costs of general administration and pickup and delivery," Scherck adds. As long as Fed Ex can keep those costs in line, it should provide competition to UPS.

Most U.S. combination carriers still treat cargo as an ancillary service, Scherck notes. "Five percent of revenue (cargo's average contribution)

continued

A CASE OF FORWARD(ER) THINKING

The newly-formed Hi-Tech Forwarders Network is dedicated to maintaining an edge in the airfreight business, despite the encroachment of integrated operators like Fed Ex, UPS and DHL. Its members are independent forwarders, often the market leaders in their region. "We're not small, but we're not multinationals, either," says President Stephen Russell. His San Francisco-based company, Alrod International, is a

case in point. It's grown due to the Silicon Valley's massive use of airfreight, but not to the point where it can justify opening global branch offices. Back in 1989, Russell realized there were companies like his all around the globe, approaching the same plateau.

"We were told by a major customer that we were the greatest Mom & Pop company they worked with, but now they needed a partner that could provide global supply chain tracking." That's when Russell decided to bring together independents like Alrod, who could link operations through a global EDI network. "That way we can offer shippers a network where they're getting the leading independent operator in each market." There are 11 U.S. companies currently in the fold, 46 international members and 60 more under consideration.

The Hi-Tech aspect of the entity is two-fold: sophisticated hi-tech communications is the glue, and techno-products will comprise the bulk of the Network's business. This allows all members to tap into the lucrative hi-tech market without having to sacrifice their traditional area of expertise. This isn't an informal thing, either: members have contractual obligations to the group, including performance bonds, bidding requirements and confidentiality clauses.

The group doesn't plan to pool freight in order to get airline discounts. "The members are large enough that they've got their own pricing leverage," says Russell. "Getting guaranteed space is more important than price." Through the pooled resources of members, Russell hopes HTFN will be able to convince carriers (who are invited to be associate members) to help them offer a door-to-door product. ■

equals five percent of input on flight scheduling," he says. Most airlines could compete with integrators in head-to-head competition, but that will never happen as long as the majority of the public wants to fly in daylight, as opposed to freight's more economical fly-by-night hours.

On the international side, the considerations aren't much different. Except for freight forwarders. Domestically, the integrators have all but driven air forwarders to extinction. International, however, is another story. Niches abound for forwarders, either for those with specific geographic strengths or commodity expertise (see sidebar, pg. 34).

"Various regions of the world are at various stages of duplicating what's happened in the U.S. market," says Scherck. Europe, for example, seems headed toward a market mirroring the state system in the U.S. "Shipment demographics will soon mirror what the U.S. looked like after deregulation," says Scherck, "but it will happen much faster than it did here, because of what they've learned watching us." A major factor in the development of a more integrated European airfreight market will be Europe's excellent rail system, which provide swift competition when it comes to rapid cargo movements. It may help keep air rates low on the Continent.

Asia is a bit further behind Europe in developing a cohesive airfreight market, due mainly to more dramatic geographic and political separations between countries. But the market continues to grow, mainly due to the many high-tech sourcing centers based in the region.

Essentially, the future of the airfreight business is based on three key logistical trends: more frequent shipments; lighter weight shipments; and higher value shipments. "Today, half of one percent of total global trade (calculated by weight) moves by air," Scherck notes. "That is double what it was seven years ago. We expect that number to double again by the turn of the century. But on a value basis, about 34 percent of global trade is shipped by air.

"So we're bullish on airfreight in general," he concludes. "It will evolve; competitors will fall by the wayside; but overall, it will grow." ■

Copies of The Colography Group's annual reports on domestic and international airfreight trends can be purchased by contacting them at (404) 565-0464.

AIR CARRIERS RANKED BY 1991 CARGO REVENUE

Rank	Carrier	Cargo Revenue	Total Revenue	Cargo As % of Total Revenue	Revenue Ton Miles
1.	Federal Express	$2,709,826	$7,555,246	35.87	3,622,660
2.	United Parcel Service	1,123,157	1,123,460	99.97	209,634
3.	United Airlines	704,068	11,660,131	6.04	1,214,343
4.	Northwest Cargo	696,749	7,533,713	9.25	1,684,455
5.	Delta Airlines	530,056	10,062,781	5.27	668,392
6.	American Airlines	473,808	12,098,076	3.92	883,862
7.	Air Canada	354,000	3,569,000	9.92	NA
8.	Evergreen International	217,300	358,858	60.55	NA
9.	Continental Cargo	258,886	5,283,494	4.90	563,751
10.	Canadian Airlines Int'l	217,300	2,445,300	8.89	NA
11.	USAir	167,327	6,049,170	2.77	136,665
12.	Trans World Airlines	164,418	3,657,492	4.50	368,940
13.	Pan American World Airways	123,752	2,093,898	5.91	376,694
14.	Alaska Airlines	62,898	933,629	6.74	47,436
15.	Aloha Airlines	27,228	214,022	12.72	8,056
16.	Southwest Airlines	26,428	1,313,677	2.01	12,964
17.	Hawaiian Airlines	10,757	364,339	2.95	5,242
18.	Reeve Aleutian Airlines	7,157	26,612	26.89	NA
19.	Midway Cargo	6,942	250,816	2.77	11,087
	Totals or Averages	$7,882,057	$76,593,714	10.29	9,814,181

Key: NA = not available
Source: Air Transport Association

U.S. AIR CARRIER TRAFFIC AT LEADING U.S. AIRPORTS—1991

Cargo Tons Enplaned and Deplaned

New York (JFK)	1,257,069
Los Angeles	1,141,196
Chicago O'Hare	1,071,598
Miami	967,241
San Francisco	606,008
Atlanta	599,674
Anchorage	587,817
Dallas/Ft. Worth	547,008
Newark	483,622
Dayton	441,418
Boston	347,735
Seattle	326,569
Memphis	312,016
Denver	292,625
Minneapolis/St. Paul	268,114
Ontario	256,280
Oakland	252,855
Houston	230,304
Detroit	210,785
San Juan	206,471

Source: Airports Association Council International

Yes, as inventories are dramatically reduced, airfreight will prove to be more cost-effective.

Michael F. McGrath
Director, Logistics
DuPont

It more a case of cost avoidance elsewhere, i.e.: if you airfreight in, can you truck out to your customer? Or can you repackage and then air in, and is the air cost and repackaging time a cheaper combination then using surface to ship in and paying local labor costs?

Emily Rodriguez
Director of Transportation
Esprit de Corp

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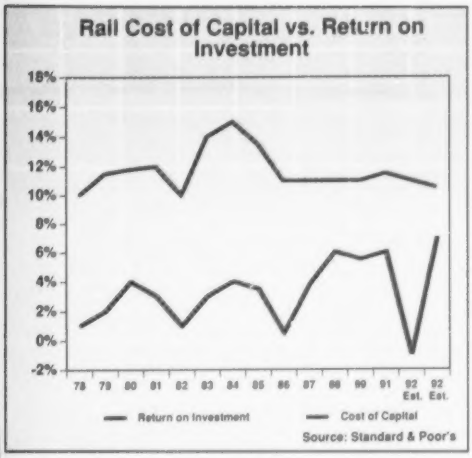

The rail industry could hit a record return on investment of 7.6 percent in 1992.

Railroads Weather The Recession Well

The future looks bullish too, as costs continue to fall and traffic begins to pick up.

By Jay Gordon, Executive Editor

Railroads appear to have handled the recent recession much more smoothly than they did the last time the economy went into a swoon in the early 1980s. Traffic, as measured in carloadings, dropped just 4.3 percent last year, according to the Association of American Railroads. That's compared to a 14.4 percent decline in the 1982 recession.

"When tallied in ton-miles, the industry actually eked out a 0.6 percent gain in 1991, to a record 1,039.8 billion ton-miles," says Stephen R. Klein, an analyst with Standard & Poor's Corporation. "This is attributable to a traffic shift favoring long-haul commodities." In 1982, ton-miles dropped 13.2 percent.

"It could have been a lot worse," says Tom White, a spokesman for the AAR. "Considering that it was a recession year, you'd have to say that (ton-mile record) was a remarkable achievement." Last year also has to be viewed as a watershed because of the reductions in crew sizes negotiated by almost every railroad. Severance payments of up to $100,000 for some employees forced the railroads to incur some $3 billion in special charges for the year, resulting in an actual earnings deficit of $38 million, according to the AAR. "Having to take those special charges was all the more painful because we had a bad economy," White says.

Even though some of those special charges won't show up until the first quarter of 1992, the railroads' are poised for significant profit growth.

While most commodity groups showed year-to-year declines in 1991, traffic remained relatively strong for intermodal, coal, grain, chemicals, food products and paper.

However, several key categories did take significant hits. Automobile shipments, which account for just two percent of the railroads' volume but 11 percent of its revenue, were off by 10 percent. The railroads' largest commodity, coal, is just the opposite: it accounts for 40 percent of the tonnage, but only 25 percent of the revenue. Coal carloadings slipped 3 percent last year, as the recession and some unseasonably warm weather reduced demand for electricity. In light of a 3.4 percent drop in coal production, however, the drop in coal shipments looks less threatening. S&P's Stephen Klein attributes this to the fact that railroads took market share from barge operators last year. Lumber was also down 10 percent, a victim of the weak housing market. And grain, which generates 10 percent of railroads' volume and 8 percent of revenues, was off 4 percent.

Besides intermodal, which posted a 0.6 percent gain in volume, one of the few bright spots was chemicals, which was down only slightly.

A recession is no time to raise rates, and the railroads saw their average revenue per ton-mile fall for the 10th consecutive year. Average revenue per ton-mile went down to 2.59 cents, the lowest figure since 1980, when it was 2.867 cents. Be-

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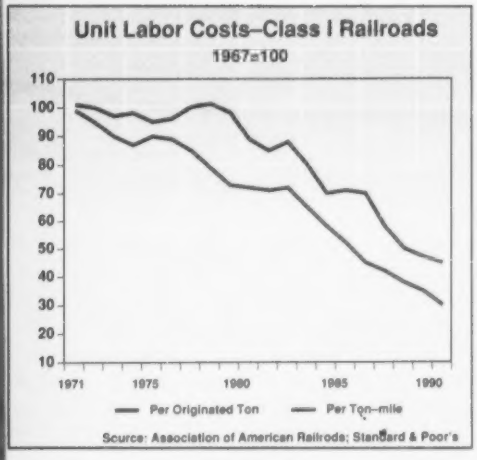


The $3 billion railroads spent on employee severance payments will pay off in lower unit labor costs.

tween 1970 and 1980, revenue per ton-mile doubled, from 1.4 cents to more than 2.8 cents, peaking in 1982 at 3.21 cents. Even with double-digit inflation in the early 1980s, this measure has been down every year since.

The Outlook for 1992

AAR's Tom White says rail traffic began showing surprising strength in the last four or five weeks of 1991, a trend that continued into the first six months of this year. If, as expected, industrial production picks up as we continue our modest economic recovery, S&P predicts that ton-miles could advance by another 3 percent, led by strong showings in lumber, autos, steel, coal and intermodal. In fact, 1992, so far, is shaping up as a banner year.

"We've only got one commodity out of the 19 we track that's down for the first 25 weeks," White says. That commodity is coal, which is off 1.5 percent as a mild winter has given way to an even milder spring.

The good news: growth in motor vehicle volume is up 16 percent for the year so far, which is actually ahead of the auto industry's rate of production. "That's much larger than you could have projected at the beginning of the year," White says; he can only guess at the reasons. Two possible explanations: traffic shifting from truck to rail, or dealers may be trying to build inventories.

Grain also is up 6 percent, mainly on the strength of export grain markets. A big wild card here, Klein says, is the economies of the former Soviet Union and eastern Europe. "Economic instability and a shortage of hard currency may lead to lower sales in these areas," he says. Chemicals are also up 5 percent, and the jump in housing starts brought lumber shipments with it, though they have since leveled off. Shipments of petroleum products are also up 11 percent.

This year should also see railroads continue to improve their cost structure. With labor costs at 45 percent of revenues, the crew size reductions

CREATING THE NEW SP

Colorado billionaire Philip Anschutz has seen nothing but losses since 1988 when he bought the old Southern Pacific and combined it with the Denver & Rio Grande. Now he apparently thinks it's high time he earned a return. He's installed a new management team and charged it with creating a "new SP," with a new mission and a new mandate: be profitable, and do it soon.

"We know what has to be changed to make the SP more customer focused," says Don Orris, executive vice president of distribution services and one of three executives brought in from American President Companies, SP's biggest customer, to effect radical changes in the railroad's service.

The first step is to generate more traffic, especially intermodal, which is now growing at 10 percent a year. To keep the momentum going, SP is investing in 4,400 domestic containers and partnershipping with truckload carriers. Other rail traffic is growing at nine percent. "The railroad is sitting on industries that are growing faster than the economy, such as steel minimills and chemicals," Orris says. The greatest potential, though, may lie in SP's Mexican traffic. Currently, this is a $200 million business that's growing at 20 percent annually.

Service has been improved by getting to the root of problems. Orris points to a complete turnaround in productivity at SP's Intermodal Container Transfer Facility near the ports of Los Angeles and Long Beach. In a dramatic move earlier this year, the SP threw out the International Longshoremen & Warehousemen's Association and put in their own people. "Everyone said this couldn't be done," Orris says.

He claims the new SP's financial turnaround will be just as dramatic. The railroad has already had some success; first quarter 1992 revenues are up $48 million, or 9.1 percent over the first quarter of 1991. And, operating losses dropped from $64 million to $23 million. "We will be in the black in 1992," Orris says, "and producing a positive cash flow in 1993."

That should make Phil Anschutz happy. ■

Are railroads more service responsive today?

"Railroads finally see themselves in the transportation business, and truckers as competitors. There is more price awareness and flexibility today, and a better focus on transit time reliability and consistency."
J.T. Ampuja
Vice President, Logistics
Rich Products Corp.

"The biggest difference we've seen is an awareness that service must improve. Action must follow."
Jacob L. Farrell, Jr.
Director of Logistics
Corn Products
A unit of CPC Int'l

were critical. In addition, last year's contract settlement included provisions for cutting the mileage-based overtime formula, concessions on work rules and some sharing of health costs, Klein says.

Filling a More Strategic Niche

The brief national rail strike in June may create a blip in the AAR's carloading figures. However, the strike's impact also helped spotlight the critical role railroads are playing in the supply chains of certain industries—particularly the auto manufacturers. Though the strike lasted just two days, at least one car maker had to shut plants down, while others eliminated one or two shifts. "The auto industry looks at the railroads as an extension of the assembly line," White says. "They just don't have the inventory on hand, because JIT rail delivery lets them get by without it.

"Years ago, people doubted the railroads could *ever* provide that quality of service," he adds. "But we've shown we can do it." A vast majority of this freight is moving under contract, and the railroads are able to charge higher rates for it; but they also must meet some tough delivery schedules, with penalties for non-performance.

"You're only going to see more of that," White says. "This type of service is expensive, but the shipper is more willing to pay for it because he's saving much more than that on reduced inventory." It also forces the railroads to hunker down and work with their partners to provide a better quality service. "If you want to keep the business," he says, "you can't point fingers."

Another good omen for the rail industry is its increased focus on asset management. "What I have seen indicates they did better in 1991 than 1990, and are expecting to do better in 1992," says Elliott Schrier, an analyst with Manalytics in San Francisco. "They're doing a much better job of fleet management." Increasing return on assets, he adds, is important "because the rail industry has traditionally had a problem with reinvesting in itself."

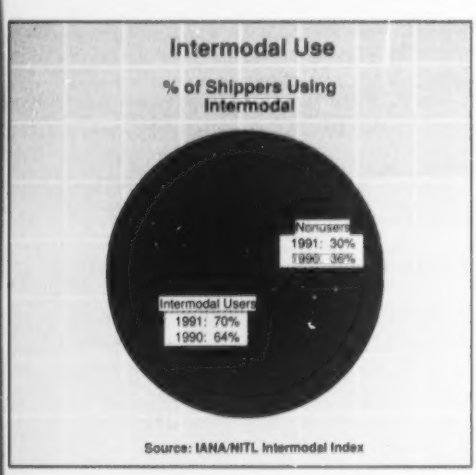
As the railroads' profit picture improves, where will they invest?

- **Equipment.** The railroads will address the commodities that promise the greatest growth. That means investing in more efficient facilities for coal and intermodal, and new technology for chemicals.
- **Track.** Double-stack trains move at high speeds, with a lot of weight on the axles. The track bed needs to be in excellent shape. ■

RAIL SYSTEMS: 1991 vs. 1990 ($ millions)

Major Railroads	1991 Revenue	1990 Revenue	% of Change	1991 NOI	1990 NOI	% of Change	1991 ROI	1990 ROI	% of Change
1. Union Pacific	$4,662.96	$4,587.74	+1.64	$78.21	$548.42	-85.74	1.32	9.79	-86.52
2. Burlington Northern	4,558.65	4,674.41	-2.48	(110.90)	414.08	NM	0.00	10.80	NM
3. CSX Transportation	4,336.38	4,435.76	-2.24	(129.82)	370.10	NM	0.00	5.76	NM
4. Norfolk Southern	3,653.97	3,785.99	-3.49	222.58	502.55	-55.71	10.29	4.40	+133.86
5. Consolidated Rail Corp.	3,136.55	3,292.86	-4.75	(130.98)	295.27	NM	0.00	5.13	NM
6. Southern Pacific Lines	2,670.27	2,760.79	-3.28	(340.63)	(16.84)	NM	0.00	0.00	NM
7. Atchison, Topeka & Santa Fe	2,153.54	2,111.62	+1.99	183.85	278.20	-33.91	5.29	8.60	-38.49
Regional Railroads									
1. Chicago Northwestern	$803.03	$809.95	-0.85	$54.64	$68.47	-20.20	4.99	5.78	-13.67
2. Soo Line	589.25	593.96	-0.79	24.72	44.95	-45.01	3.75	8.17	-54.10
3. Illinois Central	549.73	544.17	+1.02	114.33	111.44	+2.59	14.89	15.13	-1.59
4. Kansas City Southern	322.25	319.89	+0.74	37.67	36.73	+2.56	8.77	9.41	-6.80
5. Grand Trunk Western	270.44	310.05	-12.78	(40.69)	(0.88)	NM	0.00	0.00	NM
6. Florida East Coast	138.21	142.64	-3.11	(0.12)	5.22	NM	0.00	2.56	NM
7. Wisconsin Central	113.66	113.29	+0.32	22.30	23.80	-6.30	9.70	12.90	-24.81
Totals or Averages	$27,958.89	$28,483.12	-1.84	($14.84)	$2,681.51	NM	4.21	7.03	-40.11

Key: NOI = net operating income; ROI = return on investment; NM = not meaningful
Source: AAR



Intermodal picked up new users in 1991, but existing customers will fuel growth.

Intermodal Wins New Converts

This mode made small gains last year as an alternative for cost-conscious shippers. The real payoff may lie ahead.

By Jay Gordon, Executive Editor

Years from now, the intermodal industry may look back at the current recession as the best thing that ever happened to it.

Not only did intermodal volumes remain strong, they actually grew. Shippers, scouting the best bargains for their transportation dollar, looked to the intermodal alternative to help them stretch their budgets. In some cases, those shippers had not used intermodal since the last recession in 1982.

"The surprise they got," says John McQuaid, president of the Intermodal Association of North America, "was that this is a fundamentally different business than it was a decade ago. Many of them were attracted by the price—but they'll stay because of the service."

Winning new converts has proved difficult for the intermodal industry, which has for decades suffered under a stigma of lackadaisical service, high damage rates and poor coordination among the entities involved. This perception has helped keep non-users on the sidelines, according to the 1991 Intermodal Index, a survey of shippers produced jointly by IANA and the National Industrial Transportation League (see *Tooting Intermodal's Horn*, May 1992, p. 46). Intermodal's growth is being driven in large part by existing users. But trends are afoot that signal a shift in intermodal perceptions and usage:

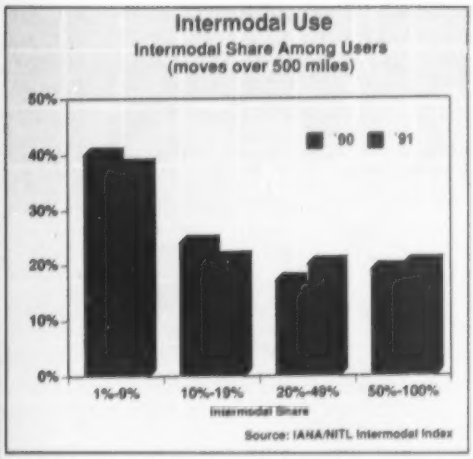
• **Testimonials from the truckers.** Endorsement of intermodal is coming from the unlikeliest of corners—the truckload carrier industry. Driven by the need to reduce linehaul costs and keep a shrinking pool of drivers happy, TL carriers are forming partnerships with the railroads at an unprecedented pace. "Cementing those relationships is the belief that rail service is consis-

continued

INTERMODAL TRAFFIC—1991 vs. 1990

Railroad	TOTAL UNITS 1991 Total	TOTAL UNITS 1990 Total	TOTAL UNITS % Change	CONTAINERS 1991 Total	CONTAINERS 1990 Total	CONTAINERS % Change	TRAILERS 1991 Total	TRAILERS 1990 Total	TRAILERS % Change
Union Pacific	1,164,915	1,019,890	+14.2	649,420	557,251	+16.5	515,495	462,639	+11.4
Conrail	1,140,414	1,164,023	-2.0	562,795	531,276	+5.9	577,619	632,747	-8.7
Atchison, Topeka & Santa Fe	1,037,203	974,147	+6.5	383,796	308,568	+24.4	653,407	665,579	-1.8
Burlington Northern	1,022,478	1,170,207	-12.5	617,801	638,339	-3.2	404,677	531,868	-23.9
Southern Pacific	1,008,597	1,013,307	-0.5	714,940	672,810	+6.3	293,657	340,497	-13.8
Norfolk Southern	860,275	822,199	+4.6	375,719	340,425	+10.4	484,556	481,774	+0.6
CSX Transportation	706,833	733,042	-3.6	340,916	339,952	+0.3	365,917	393,090	-6.9
Chicago & North Western	615,419	583,688	+5.4	537,847	508,845	+5.7	77,572	74,843	+3.6
Florida East Coast	374,843	398,085	-5.8	36,457	15,722	+131.9	338,386	382,363	-11.5
Soo Line	209,121	185,419	+12.8	163,378	120,284	+35.8	45,743	65,135	-29.8
Kansas City Southtern	72,965	73,701	-1.0	26,216	21,233	+23.5	46,749	52,468	-10.9
Grand Trunk Western	52,634	114,388	-54.0	15,142	23,787	-36.3	37,492	90,601	-58.6
Wisconsin Central	28,390	20,454	+38.8	6,265	4,621	+30.0	22,125	15,633	+41.5

Source: AAR



A majority of intermodal customers use it for less than 20 percent of their shipments moving 500 miles or more.

tent with their requirements," McQuaid says. "The truckload industry has set the standards for customer service, so (intermodal) must be meeting their service requirements." This could have a profound impact on reluctant shippers who are watching this scenario unfold. "Shippers who look at J.B. Hunt and Schneider National as industry pace setters and see them use intermodal, they will at least have to look at that option," McQuaid says.

For the railroads, these relationships solve one of their main concerns—asset management. The average turaround time for a TOFC trailer is 17 days; in the truckload industry it's seven days—an enormous gap. "With J.B. Hunt and the others, you have partners that bring assets to the table," McQuaid says. "They are using their own equipment, and they have a track record of intensely managing those assets. That is very appealing to a rail industry that traditionally has viewed asset utilization as its Achille's heel."

The question immediately arises whether the investment and interest on the part of the truckers is transitory, or whether they will be around for the "long haul." That will be determined entirely by economics. McQuaid points out that last year, top management at a number of TL carriers were vehemently opposing anything that would benefit the railroads because of their opposition to the LCV issue. "Now they see the value of intermodal partnerships," McQuaid says. "Those are bottom line issues."

One group that isn't ecstatic about the situation is the shippers' agents. A dramatic example of this was the tiff at this year's Intermodal Expo between the third parties and J.B. Hunt. The trucker was marketing its new intermodal service with a flyer that was disparaging toward them, the agents claim. "It's understandable in an industry that is going through enormous change and rationalization, that there are some concerns among the third parties, particularly about the long-term strategic plans of the railroads," McQuaid says. "Sure there's likely to be some rationalization in the third party environment. But there will always be a role for them." Many intermodal shippers have developed relationships with the third parties, and will ship only with them, he points out. Another positive development, he adds, is that shippers are increasingly using three-way con-

INTERMODAL CONSENSUS BUILDING

Now that there is one intermodal trade group instead of three, the industry can stop finger pointing and start consensus building. At least that's what John McQuaid hopes. McQuaid is president of the newly formed Intermodal Association of North America, which was created last fall when members of three groups—the Intermodal Marketing Association, Intermodal Transportation Association and the National Railroad Intermodal Association—voted to merge.

In the past, those three groups have all tended to pursue their own agendas, which caused the intermodal industry to lose face both in Congress and, perhaps more importantly, with shippers. The railroads were members of all three organizations and paid the lion's share of the dues in each. They gradually grew tired of supporting different groups that always seemed at crossed purposes, and began forcing the merger issue. Now, members can hash things out together and then present one view—rather than three.

"One of the strengths of the organization is that it's structured in such a way that our committees will deal with substantive issues with all the major players at the table," McQuaid says. "We will deal with problem solving instead of responsibility avoiding." It worked a little differently in the pre-merger environment. In the ITA, for example, if the draymen raised an issue it would be referred to either the rail or steamship division for action—and that group would adopt something that generally protected only its own interests. ■

tracts to get all the intermodal players (shipper, railroad and third party) to clearly define and agree on what's expected of each.

• **Intermodal's increasing role in supporting just-in-time.** Procter & Gamble, for instance, is using intermodal as part of its Continuing Replenishment Program. Intermodal's move from "hard goods" into "soft goods"—the service-sensitive retail industry—is an indication of this mode's improved performance. "There has been this renaissance in the past two years," McQuaid says. "A veil was lifted and a light went on."

• **Intermodal's warts are being addressed.** Drayage, for example, is no longer the "black hole" it once was. "I'd like to put that analogy behind us," McQuaid says. Third parties, and the railroads, are beginning to recognize that the drayman is an integral part of the program. "It shouldn't be the cheapest investment intermodal makes. The drayman is the one the shipper sees, and he needs to be committed to EDI. He has to be adequately compensated to do that."

Just as shippers are moving to a "core carrier" concept, "the railroads are moving toward core draymen," adds Dean Wise, a principal with Mercer Management Consulting, the firm that compiles the Intermodal Index. "The railroads and third parties can count on better coordination with fewer parties, and each company gets the benefit of volume," he says.

• **The explosion in domestic containerization.** For the first time, containerloads originated are substantially ahead of trailerloads, as reported to the Association of American Railroads. The ride characteristics of double-stack trains have combined with improved track and roadbed conditions to give intermodal a ride that is comparable, and sometimes superior, to truck. "We have virtually eliminated damage associated with transit," McQuaid says.

The growth in double-stack has been enough to counter a "disinvestment" in the trailer market. While long-term trends favor COFC, there will always be a niche for trailer traffic; McQuaid says it may even bounce back now that some legislative issues have been resolved. "Part of the problem is that the intermodal investment structure was frozen because of concerns about what would happen with LCVs," he says. The railroads last year successfully lobbied against longer combination vehicles—trucks with longer double and triple trailers. "Now we'll see that money come in to support the equipment needs of the industry," McQuaid says.

• **The undercharge factor.** Some of the premium services that have sprung up have actually been able to command premium prices. "I think shippers have changed, and a lot of that has to do with the undercharge situation," McQuaid says. "They realize that carriers have to make an adequate return if they're going to be around. They are not reluctant to pay a premium if you deliver what you promise." ■

Has drayage improved?

"The image of drayage equipment having only 17 wheels and broken springs has changed. We find many intermodal sales people to be more knowledgeable, as they are selling a service that requires the use of multiple modes."

Jacob L. Farrell, Jr.
Director of Logistics
Corn Products
A unit of CPC Int'l

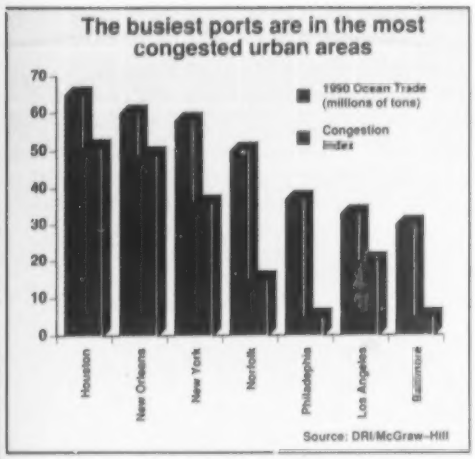
"Draymen, for the most part, have now joined the team and recognize the vital role they play in intermodal service."

J.D. Youngblood
Transportation Mgr.
GE Appliances

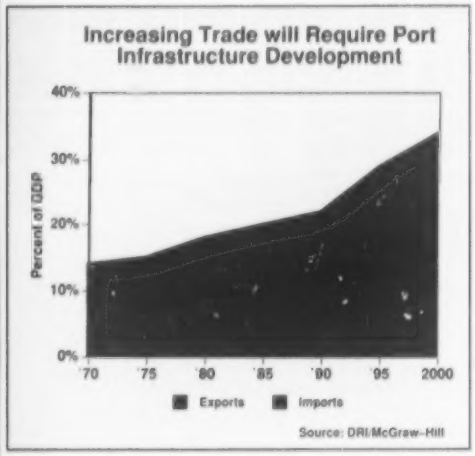
Would you rather purchase intermodal from a trucker or a third party?

"A third party. Truckers have not yet proven their capabilities. I expect our confidence in their service will improve with experience."

J.D. Youngblood
Transportation Mgr.
GE Appliances



The problem: the busiest ports are in the most congested areas.



A better infrastructure will have to be developed within U.S. ports.

Development Is Stuck in the Mud

With little help from the government, U.S. ports are finding their projects stuck at the drawing board because of sticky environmental issues.

By E.J. Muller, Senior Editor

Ports used to operate in splendid isolation, typically with marine engineers at the helm. They were funded by bond measures, or state or local taxes, and the public never paid much attention to what happened on the waterfront unless there was a violent dock strike. Ah, the good old days.

Today, the port industry is buffeted by a storm of debate on what role these vital entities should be fulfilling in society's infrastructure. In virtually every region of the country, environmental issues have complicated the efforts of ports to keep pace with accelerated developments in global trade. Ports must be sensitive to the competitive economic issues facing the ocean and air carriers that provide the core of their revenues, but more than ever those concerns must be balanced against the concerns of the public at large—which, rightly or wrongly, often views ports as a main source of air, water and noise pollution.

"The reality is that ports are caught in a crazy quilt of environmental goals and objectives that are not only at odds with the ports' economic development mission, but are in conflict with each other," says Erik Stromberg, president of the American Association of Port Authorities. According to Stromberg, the balance between commercial development and environmental protection is tilting toward the latter. Ports are such a large stationary target that it's easy to see why that's the case. Numerous port projects around the country, aimed at accommodating growing import/export levels, may never be realized due to the added costs of environmental measures. Often, just the delays involved in debating the issues can kill a project. Stromberg notes that port managers now build mitigation costs, anywhere from 10 to 50 percent of total project costs, into their budgets.

The fact that the Army Corps of Engineers is now billed as an environmental agency must be alarming to ports, as well. It's come into closer alignment with the EPA in analyzing port projects. According to Stromberg, the EPA is taking an aggressive approach to controlling industrial expansion by suggesting alternative ports if dredging projects adversely affect environmental conditions within a port area.

The Port of Oakland, California, is a microcosm for what's happening nationwide (worldwide, actually). Located between the "load centers" of Seattle/Tacoma and Los Angeles/Long Beach, Oakland needed to dredge its harbors to a lower depth in order to berth new, larger vessels. Without dredging, Oakland's competitiveness would sink. At every turn, proposals for dumping the spoil were nixed by various NIMBY environmental groups. The port was left pretty much to its own devices to marshal its public relations campaign, which focused on the vital role it played in the economic life of the city and region. The fits and starts went on for more than two years—through four different port directors.

In the midst of the campaign, a new mayor entered city hall. He promptly found a solution to the

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city's budget crisis: siphon port revenues into city coffers. Port officials saw future projects headed for oblivion. But local and international business people united in support of the port's autonomy, and the mayor backed down. Months later, thanks to the concerted effort of two Congressmen and the Governor, the port got the okay to dredge—and dump the spoil in a cost-effective spot in the bay. All seemed well.

Then California's mayors had a meeting with the state's Assembly Speaker, one of the most powerful politicians in the state. They wanted innovative solutions to the state's monumental budget crisis; something that would keep the state from hacking away at municipal entitlements. Within weeks a bill was moving through the legislature which could give the state authority to, in essence, confiscate revenue from the ports to replenish the state treasury. If the bill becomes law, it will set a startling precedent that could devastate port coffers nationwide. As Stromberg notes, if the tradeoff presented to the public is between schools, roads, hospitals on one hand, and marine terminals on the other—guess who wins?

"It's the same thing all around the country," says Henry Marcus, professor of marine systems at Massachusetts Institute of Technology. "All ports share these same problems, and there are no obvious solutions."

Marcus thinks that something dramatic is needed to focus federal government attention on port problems. Competitiveness between ports, however, seems to preclude a lobbying effort like the one Sea-Land and American President Lines used to force White House action on a new subsidy reform policy. Marcus has the grim view that even if a major port were to fail, it would barely register on the national political agenda.

"The situation is definitely worse than it was five or six years ago," he says. "It is much tougher to get anything done now. But the stakes continue to get higher and higher. It's not yet clear how things are going to shake out." ■

NEW YORK/NEW JERSEY CELEBRATES SUCCESS IN NORTHEAST

Considering the gloomy state of national port affairs, it isn't easy to find a port director with a positive attitude. But Lillian Liburdi, chief of the port of New York/New Jersey, certainly tries. She believes the port can play an important role in boosting trade in the Northeast region. "We're taking an active responsibility in the success and growth of regional businesses," she says.

What role do shippers play in the port's marketing strategy? "Shippers are why ports are in business," she says, "and understanding that principle puts things into perspective. It helps a port define its mission; it helps set goals and measures for performance; it helps determine successes in quality improvement."

Under Liburdi's stewardship, the port has achieved some significant gains. That's no small feat considering the distressing trends that have hit U.S. ports—especially in the volatile business climate of the Northeast. Liburdi charts some recent successes: the start-up of a daily doublestack service offered by Conrail from New York to Chicago; a new dockside ExpressRail interim intermodal facility that will provide a second DS service six days a week; improved distribution space; rail enhancement at the Auto Marine Terminal; continued development of ACES, the port's expansive EDI networking system; and, reduced labor and port costs brought about through ongoing negotiations with the International Longshoremens' Association.

None of these projects have the massive scope associated with the "load center" label bestowed on NY/NJ in the mid-80s; but they are good examples of the diligent nurturing that beleaguered ports have had to maintain through a very tough few years. Liburdi anticipates that NY/NJ will continue to enhance its position as a cargo thoroughfare by using high-tech systems to spur the "seamless transfer" of goods, in conjunction with traditional harbor and terminal services. ■

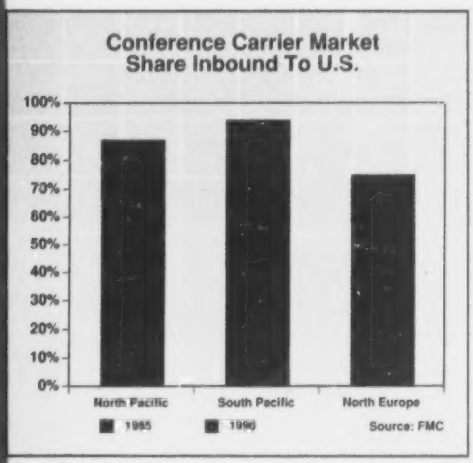
U.S. WATERBORNE FOREIGN COMMERCE – 1991
PORT RANKING – BY CARGO VOLUME
(Short Tons, 000s Omitted)

IMPORTS			EXPORTS			TOTAL		
Rank	Port	Volume	Rank	Port	Volume	Rank	Port	Volume
1.	Houston	41,068	1.	Hampton Roads	63,614	1.	Hampton Roads	71,956
2.	New York/New Jersey	38,431	2.	Gramercy (LA)	39,731	2.	Houston	67,560
3.	Corpus Christi	30,345	3.	New Orleans	29,727	3.	Gramercy (LA)	61,172
4.	Philadelphia	22,807	4.	Houston	26,492	4.	New Orleans	47,584
5.	Gramercy (LA)	21,441	5.	Baton Rouge	16,587	5.	New York/New Jersey	46,238
6.	Texas City	20,891	6.	Long Beach	15,246	6.	Baton Rouge	36,474
7.	Baton Rouge	19,887	7.	Tampa	14,631	7.	Corpus Christi	35,159
8.	Lake Charles	18,703	8.	Baltimore	14,501	8.	Long Beach	26,122
9.	New Orleans	17,857	9.	Portland (OR)	13,823	9.	Los Angeles	25,231
10.	Port Arthur	17,536	10.	Mobile	13,582	10.	Lake Charles	24,605
11.	Pascagoula	16,894	11.	St. Rose	12,783	11.	Philadelphia	24,053
12.	Los Angeles	13,097	12.	Los Angeles	12,134	12.	Baltimore	23,913
13.	Paulsboro (NJ)	12,746	13.	Tacoma	9,627	13.	Texas City	23,547
14.	Christiansted (VI)	11,549	14.	Destrehan (LA)	9,490	14.	Mobile	20,619
15.	Long Beach	10,876	15.	Seattle	8,483	15.	Port Arthur	20,503
16.	Baltimore	9,412	16.	New York/New Jersey	7,807	16.	Tampa	20,335
17.	Boston	8,767	17.	Charleston	5,937	17.	Pascagoula	20,285
18.	Chester (PA)	8,473	18.	Savannah	5,906	18.	Portland (OR)	16,773
19.	Hampton Roads	8,342	19.	Lake Charles	5,902	19.	St. Rose	14,727
20.	Mobile	7,037	20.	Corpus Christi	5,614	20.	Seattle	14,608
21.	Freeport (TX)	6,519	21.	Anchorage	5,516	21.	Tacoma	14,522
22.	Seattle	6,125	22.	Duluth/Superior	5,473	22.	Paulsboro (NJ)	12,932
23.	Portland (ME)	6,038	23.	Toledo	5,333	23.	Christiansted (VI)	12,666
24.	Tampa	5,704	24.	Kalama (WA)	5,284	24.	Savannah	10,822
25.	Wilmington (DE)	5,578	25.	Longview (WA)	4,775	25.	Destrehan (LA)	9,575

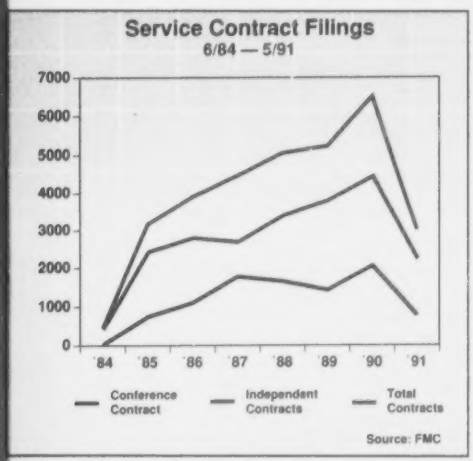
U.S. WATERBORNE FOREIGN COMMERCE – 1991
PORT RANKING – BY CARGO VALUE
(Millions of Dollars, 000s Omitted)

IMPORTS			EXPORTS			TOTAL		
Rank	Port	Value	Rank	Port	Value	Rank	Port	Value
1.	Los Angeles	45,129	1.	New York/New Jersey	17,861	1.	Los Angeles	57,375
2.	Long Beach	37,020	2.	Houston	14,280	2.	New York/New Jersey	49,575
3.	New York/New Jersey	31,714	3.	Los Angeles	12,246	3.	Long Beach	48,863
4.	Seattle	20,201	4.	Long Beach	11,843	4.	Seattle	26,012
5.	Tacoma	17,446	5.	Hampton Roads	10,294	5.	Houston	24,901
6.	Oakland	10,821	6.	Oakland	7,587	6.	Tacoma	23,509
7.	Houston	10,621	7.	Baltimore	7,496	7.	Hampton Roads	19,174
8.	Baltimore	9,108	8.	Charleston	7,206	8.	Oakland	18,408
9.	Hampton Roads	8,880	9.	New Orleans	6,502	9.	Baltimore	16,604
10.	Charleston	6,748	10.	Tacoma	6,063	10.	Charleston	13,954
11.	Port Huron (MI)	5,724	11.	Miami	6,001	11.	New Orleans	11,428
12.	Savannah	5,475	12.	Seattle	5,811	12.	Savannah	10,591
13.	New Orleans	4,926	13.	Savannah	5,116	13.	Miami	9,608
14.	Jacksonville	4,903	14.	Gramercy (LA)	5,097	14.	Gramercy (LA)	8,034
15.	Philadelphia	4,881	15.	Portland (OR)	3,290	15.	Jacksonville	7,483
16.	Portland (OR)	3,738	16.	Jacksonville	2,580	16.	Portland (OR)	7,028
17.	San Francisco	3,654	17.	Baton Rouge	2,355	17.	San Francisco	5,796
18.	Miami	3,607	18.	Wilmington (NC)	2,211	18.	Port Huron (MI)	5,731
19.	Boston	3,306	19.	Anchorage	2,204	19.	Philadelphia	5,704
20.	Corpus Christi	3,118	20.	San Francisco	2,142	20.	Port Everglades	4,873
21.	Port Everglades	2,886	21.	Tampa	2,009	21.	Baton Rouge	4,636
22.	Gramercy (LA)	2,423	22.	Port Everglades	2,007	22.	Corpus Christi	3,946
23.	Texas City	2,319	23.	Wilmington (DE)	1,889	23.	Boston	3,893
24.	Baton Rouge	2,281	24.	St. Rose (LA)	1,755	24.	San Juan	3,723
25.	Chester (PA)	2,251	25.	San Juan	1,339	25.	Wilmington (DE)	3,284

Note: Rankings are based on waterborne foreign commerce and do not include cargo moved domestically between U.S. ports.
Source: U.S. Bureau of the Census



Conference carrier market share decreased the most in the South Pacific.



After peaking in 1990, service contract filings have dropped off.

Ocean Carriers Are Holding Their Own

Ocean carriers have had their share of bad luck. Unstable trade situations, rate fixing, space sharing with rival carriers—it's all been adding up. When will it end?

By E.J. Muller, Senior Editor

"We shipping lines have been bitterly damaged, frustrated and entirely exhausted." That's the life of an ocean carrier, as described by Mutsuo Kamada, director of the North American Liner Division of Mitsui O.S.K. Lines, Ltd. "Likewise, almost all customers were also embarrassed and very much tired with unstable trade situations," he added. Thank you, Mr. Kamada, for pretty much summing up the last few years in U.S. oceanborne import and export trade.

Carriers exhausted themselves trying to lure and secure customers with a greater array of services and expansive intermodal networks, but market pressures frustrated those efforts by keeping rates at what carriers unanimously consider non-compensatory levels. That's the "bitterly damaging" part. Something had to crack, and it did. It was the egos of ocean carrier executives who never imagined they'd have to survive in this business by sharing ship space and services with rival operators. Vessel sharing agreements are the norm in major trade lanes today, rather than the exception. They are viewed as a necessary survival tactic in an increasingly costly industry.

It's another type of sharing, however, that has spurred controversy. Containership lines in the Atlantic, not satisfied with sharing only space among themselves, want to form an entity, the Trans-Atlantic Agreement, unprecedented in its cartel-like powers. In essence, it seeks to prohibit independent market responses by members, both "conference" and "non-conference," in order to attain overall stability in the volatile North Atlantic trade, where carriers have been losing money by the shipload. It is being scrutinized by the Federal Maritime Commission, which seems to favor it, and by the Justice Department, which deplores it.

Here's the crux: are these new entities truly "discussion groups," as the carriers assert, or anti-competitive price-fixing schemes? Hiroshi Takahashi, senior managing director of NYK Line, has asserted that there are "many misunderstandings of TAA. It is a general discussion group, not a rate-fixing group." The Justice Department, however, recently stated that if TAA rules prohibit members from acting independently to bring more capacity into a trade, then it amounted to the same thing as denying the right of independent action on rates. Ocean shipping is a complex business, but fundamental economic principles still apply—a reduction in supply serves to increase prices. To shippers, it seems disingenuous, at best, for carriers to maintain that groups like TAA are not rate-setting groups.

The Carriers' Case

Carriers, however, can make a strong contrary case. They are making a financial sacrifice to pull expensive vessels from well-trafficked but overtonnaged trade lanes. Many shippers have long complained that carriers need to do a better job of policing themselves. Groups like TAA may be their most effective approach. And few shippers could argue that services are worse than they

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were 10 years ago. In fact, the opposite is true. According to Ron Gottshall, managing director of the Transpacific Westbound Rate Agreement, shippers rarely have much concern for the well-being of their carriers. "The rates they argue about represent a piece of their overall business costs, but those rates represent 100 percent of a carrier's revenue," he says. Without remunerative rates, further service enhancements may be impossible.

But are further enhancements needed? The industry seems to be at a crossroads. While ocean carriers rationalize space and streamline costs on the ocean side, landside costs of intermodal connections, terminals, etc. continue to soar. American President Companies, for example, struggles to achieve profitability in its extensive domestic network, while its ocean operations hum more smoothly than ever. Other carriers have trimmed back their intermodal commitments, concentrating only on the most surefire lanes. But according to NYK's Takahashi, a multi-modal network is still the best bet for carriers. "Carriers that want to prosper must penetrate further inland," he believes. He expects to see rationalization of intermodal doublestack service that mirrors what's happening on the water.

But Conrad Everhard, president of Cho Yang USA, a fast-growing independent line, disagrees. He thinks that during the remainder of this century, carriers will refocus on the core business, namely port-to-port service, and forego further investment in intermodal extras. "Today, I can buy space on any train I want," he says. "Why would I buy the equipment?" Nor does he believe that shippers will opt for giving all their freight to a single ocean carrier that promises one-stop shopping. "The only free cheese is in a mousetrap," says Everhard. "Sooner or later the shipper will feel trapped."

Unlike Takahashi, Everhard believes that the future is almost gener-

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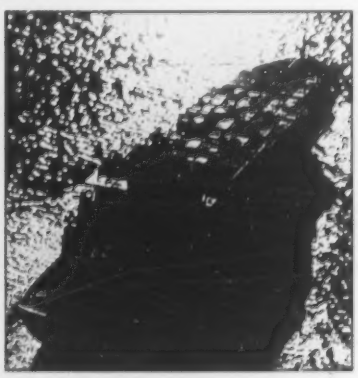
CARRIERS PROMPT NEW MARITIME POLICY

The American flag will apparently remain flying on U.S. merchant ships, thanks to a maritime reform policy package recently concocted in Washington. Without it, U.S. liners may have "flagged out," to avoid federal rules that prevented acquisition of newer cost-effective ships abroad. Although Transportation Secretary Andrew Card got credit for pushing the package up Capitol Hill and through the White House, it was the concerted effort of the nation's two largest carriers, Sea-Land Services and American President Lines, which spurred action after decades of stagnation.



By declaring that the merchant fleet was "in a state of orderly liquidation," the chief executives of APL's and Sea-Land's parent companies struck the right cord of desperation. And although they have doubts about many aspects of the package that Card was able to assemble in record Washington time, they are pleased that something's on the table. "We're flexible as to precisely how this should be done," APL's John Lillie and CSX's John Snow said at Capitol Hill hearings. "We're confident there is a range of workable solutions," they said. Congress will consider the new policy later this year.

Under the new program operating subsidies will be allowed to expire. These are federal payments made to U.S. carriers to offset the higher costs of using U.S. labor aboard ships. That's been a requirement due to wartime concerns, when merchant ships (and crews) are required for military support. Contingency retainer payments (CRP) would replace current subsidies. In exchange for these funds, U.S. flag operators would be required to provide their ships in times of war.

Under this form of subsidy, U.S. liners would be allowed to use federal Capital Construction Fund monies to acquire foreign-built ships. The plan seems to parallel the business world's trend toward globalization. ■

TOP 40 SHIP LINES

Container Traffic Through U.S. Ports, 1991 vs. 1990

International Freight in 20-Foot Container Equivalents, or TEUs

	1991 Full Yr. Imports + Exports	1990 Full Yr. Imports + Exports	Pct. Chg.	1991 4th Qtr. Imports + Exports	1990 4th Qtr. Imports + Exports	Pct. Chg.
1. Sea-Land Service	971,577	872,365	+11%	255,568	223,725	+14%
2. Evergreen Line	782,225	778,723	0%	206,913	193,071	+7%
3. American President	748,381	694,136	+8%	196,238	186,757	+5%
4. Maersk Line	693,360	691,423	0%	181,723	174,417	+4%
5. NYK Line	490,930	531,953	-8%	116,709	135,794	-14%
6. Orient Overseas	402,143	410,797	-2%	107,609	100,431	+7%
7. Hanjin Shipping	399,746	427,452	-6%	108,874	105,439	+3%
8. "K" Line	394,817	351,357	+12%	105,800	92,178	+15%
9. Mitsui OSK Line	360,691	329,981	+9%	104,854	89,377	+17%
10. China Ocean Ship	300,492	279,802	+7%	76,838	72,909	+5%
11. Hyundai Merchant	272,644	253,482	+8%	72,598	62,328	+16%
12. Yangming Marine	237,614	185,786	+28%	67,754	48,730	+39%
13. Hapag-Lloyd	224,882	235,384	-4%	53,565	60,948	-12%
14. Zim Container	196,678	197,749	-1%	52,884	49,971	+6%
15. Nedlloyd Lines	196,483	142,224	+38%	50,360	45,280	+11%
16. Lykes Lines	171,357	140,335	+22%	44,158	40,842	+8%
17. P&O Containers	155,782	160,481	-3%	42,367	42,624	-1%
18. Senator Line	154,805	106,031	+46%	45,266	24,040	+88%
19. Atlantic Container	153,274	158,232	-3%	36,887	41,741	-12%
20. Neptune Orient	138,965	138,189	+1%	42,221	34,949	+21%
21. Polish Ocean	132,005	115,055	+15%	35,215	32,789	+7%
22. American Transport	102,161	105,265	-3%	25,478	24,820	+3%
23. Dole Fresh Fruit	89,380	76,787	+15%	24,585	20,878	+18%
24. Cho Yang Line	80,304	0	+**%	29,732	0	+**%
25. CGM French Line	79,142	63,568	+24%	19,912	17,145	+16%
26. Columbus Line	76,039	72,825	+4%	20,104	18,058	+11%
27. Tropical Shipping	72,569	70,532	+3%	19,671	18,206	+8%
28. Great White Fl.	68,008	40,463	+68%	14,365	13,793	+4%
29. Mediterr. Shipping	67,669	64,880	+4%	19,427	15,633	+24%
30. Trailer Marine	66,389	64,227	+3%	18,025	16,806	+7%
31. Crowley Caribbean	66,141	71,598	-8%	19,637	15,884	+24%
32. Mexican Line	65,875	91,636	-28%	16,064	22,132	-27%
33. Westwood Ship'g	65,049	41,754	+56%	17,389	11,729	+48%
34. Seaboard Marine	56,450	42,055	+34%	16,270	10,989	+48%
35. Ivaran Lines	50,142	37,637	+33%	15,498	11,632	+33%
36. EAC Line	46,651	45,353	+3%	12,088	10,454	+16%
37. United Arab Ship'g	45,690	37,280	+23%	13,493	9,182	+47%
38. Farrell Line	45,626	47,329	-4%	12,456	10,031	+24%
39. Navieras P. Rico	43,466	41,333	+5%	11,984	10,208	+17%
40. Italian Line	42,668	46,194	-8%	11,393	12,440	-8%
TOTAL	9,907,769	9,402,387	+5%	2,633,360	2,414,229	+9%

+**% Percent increase is very large.

Notes: Percentages of change are calculated before rounding. The final total includes lines not shown with smaller 1991 tallies. Affiliated or predecessor companies have been included in the figures for Atlantic Container Line, Contship, Dole Fresh Fruit, Great White Fleet, P&O Containers, NYK Line and Wilhelmsen Lines. Trends and rankings based on physical volume may differ greatly from trends and rankings based on revenue or profits.

Source: Data from manifests and bills of lading compiled by PIERS, Port Import/Export Reporting Service, New York. Cargo carried for most military shippers is excluded from the tabulation as required by law. Empty containers are excluded, as is domestic cargo, such as freight transhipped from another U.S. port as part of an international movement.

SOURCE: PIERS/Journal of Commerce

is they are offering shippers, we've compiled an extensive, thought not exhaustive, matrix (see pages 64-67). The matrix displays the breadth of contract logistics services, from freight payment processing through complete transportation and distribution outsourcing. It by no means indicates the full extent of services offered by these companies; it does attempt to clarify their areas of expertise, and separate asset-based vendors from those offering purely management services. Bear in mind that the information contained comes from the companies themselves, in response to basic queries. This is how these vendors view themselves.

Many traffic people assume that the main goal of outsourcing logistics is to cut the corporate payroll. They are not wrong. "You should have seen the number of resumes that crossed my desk last year from traffic people who lost their jobs," says Paul White, vice president, sales and marketing, for third party vendor F. H. Traper. Corporate belt-tightening has thinned the ranks of traffic professionals. White says that "It may take a company a year or two to realize that it wasn't such a hot idea." In the meantime, third parties position themselves to fill the void.

Many logistics professionals, who have seen the writing on the wall, are voluntarily switching from their corporate jobs to positions within the growing third party market (see sidebar on LogiCorp, pg. 61). White believes this exodus will continue as companies whittle traffic departments and shift logistics purchasing decisions to accounting and finance departments. "When we started in this business," he notes, "about 70 percent of our calls were with the transportation manager. Now the majority of the time we're calling on finance and accounting."

If that trend continues, it is obvious that companies will increasingly turn to outside vendors to provide greater logistical expertise. "This industry has definitely turned the corner," White maintains. "There's no going back." ■

Information-based Third Party Logistics Vendors

F.H. Traper & Numerax (908) 602-7231	Both are subsidiaries of privately held Strategic Technologies, Inc.	Consumer Products, pharmaceutical, automotive, electronics, forest products, chemicals, manufacturing	F.H. Traper provides freight payment, auditing and rating, database mgmt, custom mgmt reporting and logistics consulting. Numerax offers dial-up access to various rate information databases	Computer systems
Bank of Boston (617) 270-3301	Freight Mgmt Services Division is a subsidiary of the Bank of Boston	Manufacturing, retailing, distribution, financial institutions, service firms	Customized freight bill processing & payment, mgmt reporting	Computer hardware & software, both owned and leased
Cass Logistics (314) 621-4121	Cass Commercial Corp., publicly owned	900 manufacturing, wholesale and retail clients	Provides data mgmt, accounting, auditing & payment systems, freight rate mgmt, shipment planning. Also provides rate software for rail and truck carriers. Provides billing & collection for third party vendors.	Information systems
KLS Logistics Services (510) 847-1800	Owned by ACF Industries; spun off from Kaiser Aluminum &Chemical Co. in 1987	Metals, aerospace, food, chemicals, heavy manufacturing, furniture	Freight payment, rate & contract negotiating, railcar fleet mgmt, material handling design and implementation, inventory control systems, private fleet analysis & mgmt.	computer software and hardware

Operations-based Third Party Logistics Vendors

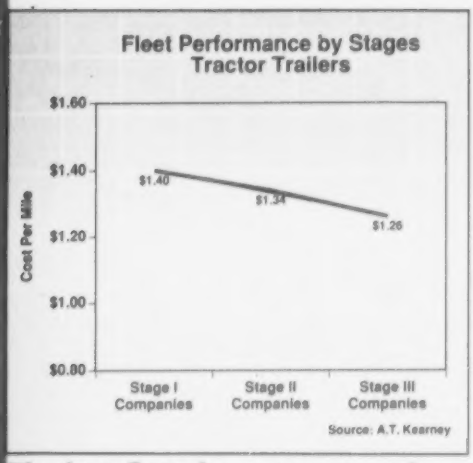
Company Name	Source Entity	Industries Served	Services	Owned Assets
Business Logistics Services (901) 395-3891	A division of Federal Express, spun off from PartsBank	Computer equipment, electronics, medical, automotive, aerospace, fashion	Information systems, order processing, warehousing, quality assurance, inventory control, transportation, credit & collection, technical support, repair, customer service	Leased facilities in Amsterdam, U.K., Singapore, Atlanta, Chicago, San Jose, Newark and Memphis. Uses Fed Ex linehaul system or contracts for surface and air transportation.
CSX Sea-Land Logistics (703) 739-4852	A subsidiary of CSX Corporation	Chemicals, paper, retailing, consumer products, beverage, construction	Consolidation, inventory mgmt, direct store delivery, logistics pipeline mgmt, bulk intermodal transfer, JIT distribution, network and asset rationalization	Longest rail network in the U.S., the world's largest shipping line and the nation's longest inland barge operation.
CTI Inc. (904) 721-2104	Subsidiary of Baronial Transportation Corp., an affiliate of CSX Corp.	Retail, pharmaceutical, chemical, building materials, furniture, appliances, food, automotive	JIT, flow-through and contract warehousing, cross-docking, bar coding, contract carriage, packaging, logistics engineering, quality inspection, sequencing, kitting, accesorizing, Quick Response, unattended delivery, home delivery	500 tractors (95% leased), 750 trailers (95% owned), 15 warehouses (100% leased), 85 forklift trucks (100% leased)
Livingston Contract Distribution (416) 626-2828	Subsidiary of Livingston Distribution Centres, a Canadian public DCnetwork	grocery mfrs and retailers, pharmaceutical & health care, consumer goods, government	Central & regional DC operation, cross-docking, kitting, local pickup & delivery, consolidation, small package handling & repacking, EDI, invoice preparation, lot/expiry date control & tracking	Facilities (5 owned, 23 leased), tractors (23 owned, 1 leased), trailers (78 owned, 3 leased), trucks (39 owned, 1 leased, service trucks (6 owned, 1 leased)
Nedlloyd Districenters (201) 617-9509	Subsidiary of Dutch-based Royal Nedlloyd Group, N.V.	Healthcare, electronics, computers, food, automotive, high-value consumer goods	Inventory mgmt, invoicing, insurance, pick/pack, quality control, labeling, collections, legal counsel, temperature control, light assembly, repacking	32 owned Districenters, 10,000 trucks (Royal Nedlloyd Cargo Int'l); 44 ships (Nedlloyd Lines)
Roadway Logistics Systems (216) 784-1600	Subsidiary of Roadway Services, Inc.	Automotive, heavy construction, lawn & garden mfg, lighting, glass, automated teller machines, small motor industry, retailing	Route and mode optimization, sequencing, subassembly, labeling, packaging, kitting, capital assumption, warehousing, cross-docking, consolidations, logistics forecasting, auditing & claims processing, carrier mgmt, EDI	Parent is one of the largest LTL carriers in the nation with a huge truck fleet and terminal network nationwide. ROLS also has current contracts with 120 other carriers in all modes.
Skyway Freight Systems (408) 722-3133	Union Pacific Corp. is a majority shareholder	High-tech manufacturers & distributors, retail, pharmaceuticals, manufacturing	Kitting, subassembly, localization, quality testing, fulfillment, warehousing & inventory mgmt, supply chain mgmt, JIT deliveries, logistics network design & mgmt, multimodal transportation	20 logistics centers nationwide, 400 trucks/trailers
TNT Contract Logistics/ TNT Nationwide Logistics (708) 913-7799	Both are wholly owned subsidiaries of TNT Freightways Corp.	Contract Logistics : retail Quick Response and medical support. Nationwide Logistics: vertical transportation mgmt, from production through final distribution..	Dedicated transportation systems, cross-dock warehouses, kitting, subassembly, inventory mgmt, freight subcontracting and payment	Transportation assets are primarily owned, warehouse assets primarily leased. Numbers are proprietary. Operations in North America, Europe, U.K., Australia and Asia.

Operations-based Third Party Logistics Vendors

Company Name	Source Entity	Industries Served	Services	Owned Assets
The Unit Companies (904) 396-2517	Acquired by GATX Corp. in 1989	Automotive, consumer electronics, grocery, HBA, industrial equipment, major appliances, pharmaceuticals	Warehousing, distribution planning, contract labor, invoicing, FTZ, inventory mgmt, hazmat, fulfillment, pick & pack, return goods, subassembly, sequencing, packaging, inspection & testing, JIT, route & load planning, fleet mgmt, consolidations, EDI	131 DCs totaling 21 million sq. ft. nationwide, mostly leased; 200 tractors, 300 trailers, mostly leased.
USCO Distribution Services (203) 597-5300	Spun off from Uniroyal in 1986	Healthcare, pharmaceutical, electronics, fulfillment, retail, paper	Warehousing, pick & pack, export, return & repair (electronics), light assembly, packaging, telemarketing, order entry, credit & account receivables, contract labor	55 facilities, mostly leased
Innovative Logistics (800) 367-4544	Carolina Freight Corp.	(in existence for three months)	Import/export, carrier selection, rate negotiation, consolidation, warehousing, information services, TL & FCL booking	IBM AS/400 computer
Trammell Crow Distribution (214) 416-9203	Trammell Crow Co.	Consumer products, petrochemical, industrial paper	Bulk-to-bulk transfers, packaging	5 million sq. ft. of warehousing space, material handling equipment. Both are 50/50 owned/leased.
Exel Logistics (614) 890-1730	National Freight Consortium (U.K.)	Consumer products, retail, industrial, business services, healthcare	LTL consolidation, TL, EDI, pool distribution, packaging, customized systems packages, pallet display building, pick & pack, JIT, trailer drop, temperature-controlled space, auditing	13 million sq. ft of warehouse space (about 25% owned), 600 vehicles (80% owned)
Burnham Service Co. (404) 563-1120	Burnham Service Corp.	Parts/supply distribution, furniture consolidation, used equipment/parts retrieval/scrap	Finished goods distribution (received offshore for North American distribution), spare parts fulfillment, consolidation/merge, installation & assembly, PC configuration	950 tractors (90% owned), 1,200 trailers; 300 straight trucks, 80 leased warehouses (7.5 million sq. ft.), mainframe computer
Fritz Integrated Logistics (404) 767-3010	Fritz Cos., privately held	Retail, manufacturing, computers, petroleum	Global logistics mgmt, warehousing, inventory control, pick & pack, forwarding, customs brokerage	4 million sq. ft. of warehouse space worldwide, information systems
Menlo Logistics (415) 327-1693	Consolidated Freightways, Inc.	Chemicals, automotive, electronics, consumer products, furniture, apparel, retailing	Integrated logistics mgmt, order processing, inventory mgmt, traffic, fleet & warehouse mgmt, cross-docking, sequencing, kitting, subassembly, receiving	Dedicated contract warehousing and contract carriage
Caterpillar Logistics Services (309) 675-8501	Subsidiary of Caterpillar, Inc.	Automotive, industrial, electronics	Inventory mgmt, material tracking, multimodal transportation, consolidation, cross-docking, redistribution, warehousing, contract labor & mgmt, consulting	7 leased DCs dedicated to CLS, access to 23 Cat-owned facilities nationwide, totaling 11 million sq. ft. of space
LogiCorp (313) 737-8340	Privately held; originally a subsidiary of Rockwell International	Primarily automotive and heavy truck	Logistics engineering & mgmt, design, coordination and implementation of cost-effective logistics solutions	Information systems

Operations-based Third Party Logistics Vendors

Company Name	Source Entity	Industries Served	Services	Owned Assets
American Distribution Systems, Inc. (313) 681-5800	Privately held	Publishing, specialty & general retailing, grocery, pharmaceutical, point-of-purchase merchandising	Specialists in catalog and sample distribution, inter-store transfer, direct store delivery, point-of-purchase logistics planning, warehousing, package design, order entry/processing, fulfillment, auditing, local pickup & delivery, in-store labor	Sold all trucks and warehouses in 1987, so as not to "prejudice" service planning, Contracts with more than 800 vendors for services.
Tower Group Int'l (212) 512-4453	Subsidiary of McGraw-Hill, Inc.	automotive, apparel, wine & spirits, metals, footwear, retail, electronics, computers	Import mgmt, data processing mgmt, international distribution, customs compliance, JIT	Computer hardware and software
C.H. Robinson (612) 937-7895	C.H. Robinson, Inc. (100% employee-owned)	Essentially a freight forwarder, serving a vast array of businesses in North America and Europe	Mgmt of domestic & intl multimodal transportation, LTL consolidation & distribution through nationwide hubs, mgmt of time-sensitive inbound/outbound projects, freight payment & auditing	Expansive computer system; all transportation is provided under contract. Owns no equipment.
INTRAL Corp. (617) 439-5880	Employee-owned; spun off from the Gillette Co. in 1987	Supports U.S. multinationals handling finished goods, raw materials, components, equipment and spares; exports and imports	Independent, shipper-oriented international logistics mgmt, emphasizing total mgmt of the global supply chain.	Computer hardware and software
Kenco Group (615) 624-9793	Affiliated with Cherokee Warehouses, Inc., privately held	Medical supplies, pharmaceuticals, plastics, textiles, appliances, electronics	Logistics planning systems, repackaging, repair, pick & pack, site optimization, automated handling systems design & installation, radio frequency bar coding, building design, storage layout	Information systems, material handling equipment, personnel; leases three warehouses and 63 trucks. Operates 18 facilities and 66 trucks leased by clients
Ryder Distribution Resources (305) 593-3897	Subsidiary of Ryder System, Inc.	Manufacturers, wholesalers and retailers in automotive, parts, food, textiles, paper, rubber, plastics, machinery, hardware, and department stores	JIT, Quick Response, IB/OB transportation, logistics system design & implementation, distribution planning & mgmt, product planning, inventory mgmt, driver services, receiving, warehousing, cross-docking, subassembly, packaging, home delivery & installation, freight brokerage, intermodal	6,100 vehicles dedicated to contract customers, 336 locations
AMR Distribution Services (817) 963-1469	Subsidiary of AMR Corp. (parent of American Airlines)	Building materials, apparel, footwear, forest products, plastics, paper, aircraft parts, computers	LTL consolidation & distribution, TL & flatbed, import/export--air & ocean, cross-dock warehousing, contract warehousing, consulting, systems support, order fulfillment, subassembly	Warehouses in Dallas/Ft. Worth, San Juan & Seattle. 55 P&D vehicles. All warehouses are leased, all trucks are owned.
Yellow Logistics Services (913) 344-5561	Subsidiary of Yellow Freight System, Inc. of Delaware	Electronics, retail/apparel, chemical, automotive	Single-source logistics mgmt, production scheduling, return goods processing, warehousing, packaging, distribution & consolidation, information services, transportation and consulting	Information systems



The best fleets have 11 percent lower costs per mile.

Service is King For Private Fleets

If private fleets are to survive tighter and tighter management scutiny, they must improve cost and performance levels, but especially customer service.

By Thomas A. Foster, Editorial Director

Few business people—even logistics professionals—realize how vital private fleets are to U.S. business. Private fleets handle the vast majority of local shipments (within 50 miles of a city), and they carry approximately one third of all non-local and intercity freight, regardless of mode. The value of this non-local transportation alone is $89 billion, which is more than the value of all other services combined.

Despite the impressive numbers, the future of private fleets has never been under more scrutiny by management.

"From my company's point of view, common and contract carriage are the best means of moving our freight," says Lou Paoli, transportation logistics manager for Schwinn Cycling and Fitness Co. in Chicago, Ill. "Private carriage is not even a consideration."

Cost effectiveness is the only issue for some companies, but the question of whether or not to have a fleet is far more complex for others.

"We currently use private carriage where it is economically advantageous such as inbound bulk short haul, or for specific service requirements," says James Terry, manager of corporate transportation for Owens-Corning Fiberglas in Toledo, Ohio. "The purpose of our private carriage is not to grow, but rather to fill certain voids in the normal conduct of business."

Increasingly, top managements evaluating the need for private fleets want to know if the fleet is serving customers efficiently, cost-effectively and productively.

To provide answers to these and other questions about the role of private fleets in U.S. business today, the National Private Truck Council commissioned consultants with A.T. Kearney to conduct a study of 251 of its members called *Private Fleet Benchmarks of Quality and Productivity—1991*.

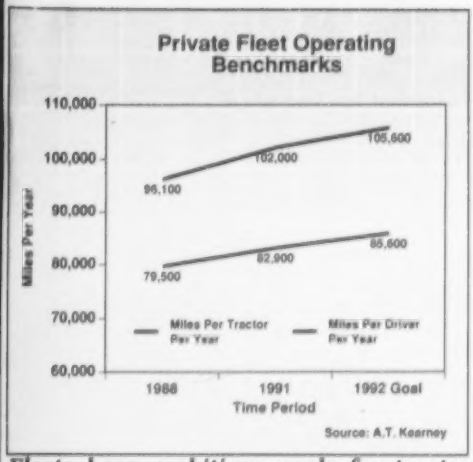
As might be expected, the study highlights the ambiguous attitudes companies have about maintaining a private fleet. For example, tractor trailer fleets, 30 percent of the companies in the study, have dropped in size since 1988, and 22 percent carry a smaller share of company outbound traffic. On the other hand, many fleets have also grown and captured larger portions of the freight. In fact, respondents to the NPTC/Kearney Study report:

1. A 12 percent average projected growth in tractor trailer fleet size from 1988 to 1994

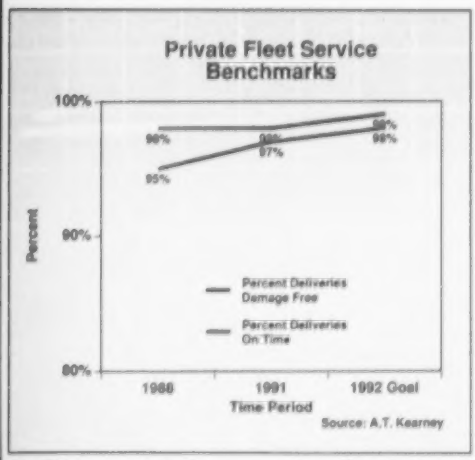
2. A net increase in the portion of inbound and outbound freight handled by the fleet. One third of the private fleets handled 80 to 100 percent of the companies' outbound freight

3. A favorable average operating cost of $1.43 for tractor trailers in 1991 compared to $1.47 in 1985 (adjusted for inflation)

4. Fleets increasingly are involved in more than moving companies' goods, but also participate in intercorporate hauling (64 percent), contract carriage (50 percent) and common carriage (18 percent) for out-



Fleets have ambitious goals for tractor and driver miles.



Delivery and damage standards must meet or exceed for-hire carriers.

side shippers; and 28 percent operated as separate companies or transportation subsidiaries.

The study also shows that fleets are holding the line on costs. Tractor trailer fleets average 96,200 miles per tractor and 78,300 miles per driver. Tractors averaged 3.5 years old and got 6.1 miles per gallon.

The study shows that private fleet non-union drivers earn 29 cents per mile and team drivers earn 16 cents. These wages did not differ significatnly from union and leased driver rates.

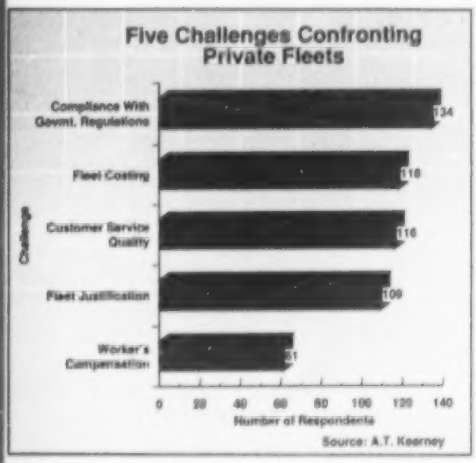
But probably the most significant finding in the study was an overwhelming recognition of quality and service as a critical mission factor for the fleet.

Of the five main reasons for having a private fleet, the top answer given by 92 percent of the respondents was service reliability to customers. The second most critical reason given was responsiveness to customers' short order cycle times. The third reason for having a fleet was maintaining direct contact with the customer (53 percent). Only two of the top three reasons were not directly related to customer service: lower cost versus the alternatives (50 percent) and the need for JIT material control (47 percent).

"Today, service is king," says Michael Lipman, the principal at A.T. Kearney who headed up the study. "Customers demand responsive quality service from their suppliers with the same fervor as they demand product quality. On-time performance isn't a service differentiator, it's a basic requirement. Despite these shifts, cost performance, the key measures of the 1980s, still hangs over the fleet like a sword on a thread. If the fleet can't perform, 'we'll find someone who can' is management's motto, and an increasing range of alternatives exist."

continued

STAGES OF TRANSPORTATION EXCELLENCE			
Dimension	**Stage I**	**Stage II**	**Stage III**
Role of fleet	• "Always done it this way"	• Lower costs • Better control	• Strategic advantage • Service
Resource Utilization	• "40 hours" mentality • No training • Part-time management • Simplistic measures	• Round-trip planning • Measure empty miles • Track utilization • Incentive programs	• Continuous movement planning • Backhaul marketing program • Satellite tracking
Cost control	• Incomplete scope/ accountability • Gross levels • "Lump sum" budget based on historical	• Broad scope • Line item budgets based on historical	• "Should cost" estimates • Budgets built up by specific activity levels • Costs by type of operation
Service goal setting	• No service goals • React to "noise level"	• Internally set service goals • Outbound orientation • No program to measure/improve	• Service goals based on customers' requirements • Formal program to measure/improve • Inbound/outbound orientation
Measurement approach	• No measures • Gross budget • No database/ formal collection process	• Measure actual • Variance budget versus actual • Detail at category level, semiautomated	• Measures versus budget and standards • Use to identify problems, reasons for low performance • Exception reports • Database/inquiry



Customer service is a concern, but fleets are bogged down with operating matters.

Lipman says this focus on customer service requires the introduction of the quality process, benchmarking and continuous improvement. One aspect of the study was to see how well established these practices were in private fleet management.

"We wanted to see how private fleets were performing, what levels of performance are possible and how fleets can reach these high performance levels," says Lipman.

Based on the performance levels reported in the survey, A.T. Kearney divided the fleets into three stages that reflected levels of sophistication (see box, page 69).

The least sophisticated fleets (40 percent) are in stage I, average companies (52 percent) are in stage II, and the most advanced (8 percent) are in stage III.

For example, a stage III company fleet has empty miles accounting for 40 percent of the total, while stage II fleets have only 4 percent empty miles. In terms of cost per mile, stage I tractor trailer fleets reported costs of $1.40, stage II $1.34 and stage III only $1.26.

The benefit of advancing performance levels of a fleet from a stage I to a stage III are significant. For example, Lipman says companies that are able to make this move will enjoy a 5 percent improvement in total miles, a 17 percent improvement in number of drivers needed, a 12 percent reduction in trailers and a 22 percent reduction in the number of tractors needed to complete the fleet's mission.

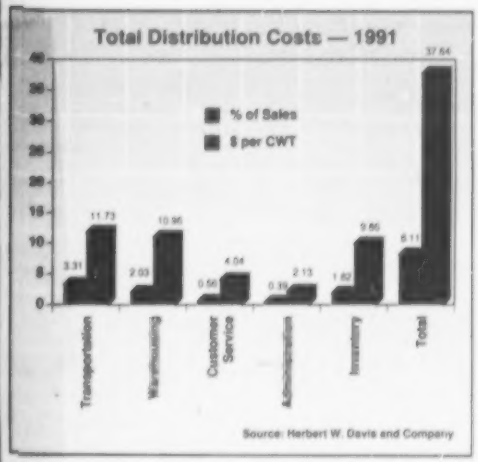
The study lists 20 "high-impact actions" fleets can take to move up the stage ladder:

1. Tie pay programs to productivity
2. Use extra board
3. Install trip recorders
4. Use incentive programs
5. Consolidate outbound shipments
6. Establish scheduled delivery appointments
7. Increase delivery size, weight or density
8. Preschedule deliveries into specific market areas
9. Call customers in advance concerning change in pickup and delivery schedules
10. Use computer-assisted routing and scheduling programs
11. Use specialized material handling equipment
12. Use specialized trailers
13. Improve maintenance effectiveness
14. Measure compliance with required PM schedules
15. Establish fleet service performance standards
16. Measure service performance
17. Develop a thorough fleet budget
18. Compare fleet costs with equivalent for-hire carriage
19. Develop benchmarks to improve performance
20. Have a formal quality and productivity process. ■

For more information on the A.T. Kearney/NPTC study, contact NPTC at (703) 683-1300.

Challenges Confronting Private Fleets
(In order of importance)

1. Compliance with government regulations
2. Fleet costing
3. Customer service quality
4. Fleet justification
5. Workers' compensation
6. On-time deliveries
7. Driver availability
8. Maintenance of trucks
9. Computers and technology
10. Hazardous materials regulations
11. Hours of service
12. Driver training
13. Lack of state tax uniformity
14. Drug and alcohol abuse training
15. Uniform safety regulations
16. Labor relations and law
17. Road congestion and road conditions
18. State tax issues
19. Intrastate economic regulation
20. Alternative fuels
21. Vehicle inspections
22. Deregulation/reregulation reforms
23. Federal tax issues
24. Local truck restrictions
25. Reasonable vehicle access



Distribution costs last year rose 10.8 percent from 1990 levels.

A Higher Price Tag For Distribution

Distribution costs rose almost 11 percent last year. The message is clear: the easy cuts have been made. For meaningful new gains, shippers must get creative.

By Thomas A. Foster, Editorial Director

Ask any logistics manager what his boss focuses on and it's bound to be lowering distribution costs. Unfortunately, few major shippers in the U.S. during the last year have succeeded in lowering these costs, according to the Davis Database, which tracks such costs for 300 large U.S. manufacturers, wholesalers and retailers. The Database has been compiled for 30 years by the consulting firm of Herbert W. Davis Co. of Englewood Cliffs, N.J.

The average company in the Database had distribution costs in 1991 of 8.18 percent of sales, which is 10.8 percent higher than distribution costs in 1990. All elements of these distribution costs went up. Transportation costs went up 5.6 percent, and warehousing costs climbed a whopping 17 percent from the previous year.

William Drumm, president of the New Jersey consulting firm, says the great emphasis that has surrounded distribution cost control in recent years has created a point of diminishing returns.

"Traditional ways to find savings, such as bigger transportation discounts and reducing staff, are not working anymore," says Drumm. "We have reached a plateau for the easy cost cutting."

He points out that there is another, non-distribution related reason for climbing costs: Relatively few companies have been able to take price increases for their products in the last year or so, yet costs of all types continue to creep up.

"If you just look at distribution costs as a percent of sales, naturally this percentage has gone up if your costs rise but your prices don't," Drumm says. This is especially true for clothing, appliances and other durable goods where consumers have become more price sensitive.

A fairer way to measure internal distribution cost performance is cost per hundredweight (CWT), which in 1991 was $43.32 for the average company in the Database. "These costs actually went down a little bit in 1991," says Drumm.

Measuring distribution costs in terms of dollars per hundredweight is a good measure of cost efficiency and distribution productivity because it takes into account proper utilization of warehouse space, labor appropriation, transportation rates and discounts, minimum inventory levels and maximum inventory turns. Nevertheless, dollars per CWT is less comparable between companies than the directly budgeted measure, costs per sales dollar. "Shippers want to benchmark themselves against other companies, and distribution costs as a percent of sales is the best number for this purpose."

Drumm says the main value of the the Davis Database is that it provides 30 years of benchmark numbers based on companies that collect their costs in a standard way.

Here are the key 1991 distribution costs measured both ways:

Transportation costs were $13.25 per CWT or 3.31 percent of sales. Warehousing was $12.07 per CWT or 2.08 percent of sales. Inventory car-

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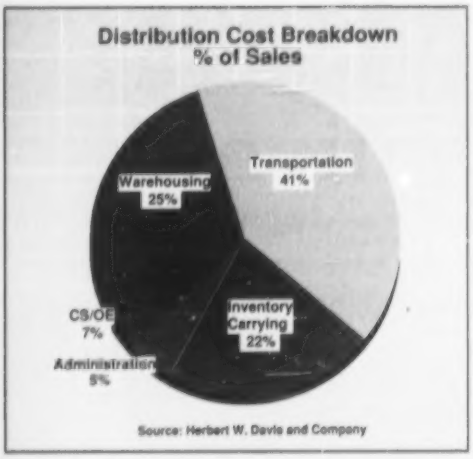

Transportation and warehousing account for two-thirds of distribution costs.

rying costs were $11.75 per CWT or 1.98 percent of sales. Customer service and order entry costs were $4.75 per CWT or 0.63 percent of sales. Administration costs were $2.13 per hundredweight, or 3.8 percent of sales. (see page 77 for definitions).

The largest single element of distribution costs is transportation, which accounts for 41 percent of the total. Warehousing is the second highest cost element, with 25 percent. Inventory carrying cost is third with 22 percent. Customer service and order entry account for 7 percent and administration is 5 percent.

Strong Central Tendencies

Drumm says there is surprisingly little variability in the data, even between industries with vast differences in product value, distribution characteristics and types of delivery systems.

"Distribution costs tend to center around the averages," says Drumm. "So, whether you produce refrigerators, canned tomatoes, paper clips or air compressors, your costs should look pretty much like those in the Database. This means that companies that say they are different are probably fooling themselves."

However, Drumm says there is a wider dispersion within each product group than between groups. "For any 10 companies in the Database, all producing similar products, there is almost always a wide variation in distribution costs—wide enough to look for assignable causes rather than to dismiss the differences," he says. "For example, we see that the average manufacturer of temperature-controlled food has costs of 8.36 percent of sales. Fully 25 percent of those companies operate at less than 5.9 percent, while another 25 percent spend 13.69 percent or more of sales revenue. These differences are worth investigating. There are going to be important reasons why some companies can ship similar products to the same customers for less than half the cost of other, higher cost companies. The stability of the Database would indicate that the trouble lies with the shipper, not with the accuracy of the Database."

This variability in costs between companies in the same industry has tremendous bottom line impact, Drumm says.

"It is not unusual for there to be a 4 percentage point difference in total distribution costs from the worst performer to the best performer in any industry," he says. "In the health

Distribution Cost in the U.S.

The 1991 Physical Distribution Cost Database includes a large cross-section of American industry. The following chart shows these costs for a number of categories in our analysis:

	INDUSTRY	VALUE			VOLUME			SIZE		
	All U.S. Companies	Average Sales			Total Weight Shipped			Total Revenue		
Percent of Annual Sales	Average	Low	Medium	High	Low	Medium	High	Small	Medium	Large
Transportation	3.31	4.47	3.13	1.47	2.68	3.31	4.00	3.57	3.27	3.24
Warehousing	2.08	2.10	1.87	1.47	2.00	1.96	1.77	2.34	1.83	1.47
Order Processing	0.63	0.26	0.71	0.61	0.79	0.54	0.23	0.70	0.58	0.23
Administration	0.38	0.24	0.39	0.33	0.34	0.39	0.23	0.36	0.38	0.20
Inventory Carrying	1.98	1.66	1.66	1.82	1.92	1.88	1.36	2.13	1.53	1.45
Other Costs	0.57	0.19	0.30	1.12	1.12	0.31	0.20	1.04	0.29	0.24
Total Costs	8.18	8.64	7.60	5.51	7.43	8.00	7.47	8.74	7.53	6.45
Cost per Hundredweight										
Transportation	13.25	4.02	10.77	30.40	22.76	9.78	4.04	12.36	15.10	6.73
Warehousing	12.07	2.00	6.88	36.66	27.03	5.78	1.92	13.34	13.24	4.75
Order Processing	4.75	0.25	2.93	11.89	8.28	2.83	0.25	4.16	4.17	2.78
Administration	2.78	0.25	1.61	10.78	6.40	1.81	0.27	2.15	4.18	0.97
Inventory Carrying	11.75	1.75	6.26	37.53	25.99	7.08	1.69	13.64	11.18	5.42
Other Costs	6.03	0.13	1.49	25.15	25.15	1.65	0.31	24.41	1.65	0.36
Total Costs	43.32	8.17	27.77	122.50	86.77	26.85	8.06	43.82	47.29	20.80

There is little difference in distribution costs between industries, yet there can be wide variations within industries.

and beauty aids industry this four percent is about the total profit margin for the industry, so high distribution costs can be the difference between making a profit or a loss."

Drumm also points out that large companies do not necessarily have a significant cost advantage over smaller shippers. The smallest companies in the Database (under $200 million) spend a larger percentage of their revenues on distribution than the others (8.84 percent of sales). However, this economy of scale levels off between $500 million and $1 billion (6.36 percent of sales) with the largest companies paying slightly more (7.14 percent of sales) than the mid-size companies.

"Large companies that have a bureaucratic organization tend to lose control of what is happening," says Drumm. "Management control over a single entity becomes geometrically harder as the organization increases in size. However, we do not see this 'diseconomy of scale' in large companies that are set up as a series of entrepreneurial units, each with a great deal of independent control.

"Overall, company size does not seem to be a significant factor in cost levels," says Drumm. "This is especially interesting since it contradicts the major reason companies centralize transportation management—to take advantage of size."

Costs Over Time

Distribution costs have fluctuated greatly in the 30 years of the Davis Database. They hit their lowest point in the late 1960s and early 1970s. Drumm says this is attributable to two major events: the opening of the interstate highway system and the adoption of the physical distribution concept by U.S. industry.

Costs hit their highest point in the mid-to-late 1970s immediately after the Arab oil embargo. Interest rates

continued

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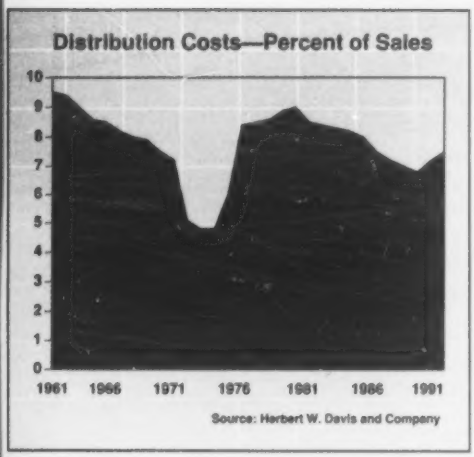

Two reasons distribution costs are rising: the easy cuts have been made, and companies have been unable to raise prices.

climbed, and so did labor costs.

Distribution costs fell during the 1980s as deregulation and technology enabled companies to get better control of distribution. But in the late 1980s and early 1990s, they have started to climb again.

Drumm lists four targets for shippers intent on improving their distribution costs and service in the 1990s:

• **Warehouse productivity.** Shippers must continue to upgrade their warehouses with automation, order picking systems and bar coded product tracking. But real productivity gains only come when these systems are successfully integrated.

"Only a handful of companies capture the potential of these systems by integrating with their suppliers, customers and carriers," Drumm says. "The current stand-alone systems cannot improve productivity throughout the supply chain."

• **Inventory productivity.** This is the area where shippers continue to make their biggest and most expensive mistakes, says Drumm. "If a company has a service problem, management makes a sweeping decision to add millions in new inventory," he says. "As soon as the problem goes away, another sweeping edict comes down to slash inventory. There is little understanding of how to manage inventories wisely, and this is the key to leveraging their entire system."

Shippers must develop tactical forecasting that is done at the middle management level weekly and daily, instead of the strategic forecasting that comes down annually or quarterly from top management. "The computer systems are there to allow this tactical forecasting and inventory management," Drumm says. "It is just a matter of management allowing the people who can best do the job take responsibility for it."

• **Number and location of warehouses.** Generally, companies should be seeking ways to have as few warehouse and distribution centers as possible. Drumm says there are often good reasons, such as competitive need to increase service or market share, to add warehouse locations. "Service can be increased dramatically with more stocking points, but this is an expensive strategy," he says.

The implication of fewer warehouses is that shippers will continue to reduce inventories and the number of stocking points by using more JIT, more Quick Response and, generally, more transportation.

While this reduces the amount of fixed costs in distribution, it increases the sensitivity of distribution to fluctuations in transportation costs, especially fuel prices.

"By the end of the decade, I think certain industries will have completely eliminated warehouse inventory," says Drumm. "Everything that is not in the stores will be in transit."

• **Customer service strategy.** Customer service levels measured by the Database have not changed in several years, according to Drumm. There has been no improvement in cycle times, fill rates or lead times. "That is because no changes are being made in the distribution systems that would boost customer service," says Drumm. "Tremendous opportunity exists but companies have to shorten manufacturing cycles, improve sales forecasting and invest in systems for DRP, order processing and Quick Response."

According to Drumm, shippers must look at the logistics system—including the links to suppliers and customers—to make the most meaningful progress. "Ask yourself two questions," says Drumm. "Do I have the right level of computerization to optimize my relationships with suppliers and customers? And, is there anything I can do to enhance or leverage my logistics relationship with customers and suppliers?"

In a nutshell, says Drumm, "if you haven't adjusted your distribution configuration, your computer systems and your links with your suppliers and customers in the last three or four years, you are probably not operating an optimum system. This is going to show up in your distribution costs, your service—and very quickly on the bottom line." ■

For more information, contact William Drumm, President, Herbert W. Davis and Co. Englewood Cliffs, NJ 201-871-1760

KEY COST COMPONENTS

The cost categories shown in the Davis Database analyses are defined as follows:

Transportation: The cost of both primary (point of manufacture to distribution center) and secondary (distribution center to customer) movement of finished goods. Because secondary movements are frequently LTL or other types of smaller shipments, this type of transportation traditionally costs about twice that of primary freight.

Warehousing: The cost of both plant and field warehouses, with labor comprising the highest element (about 55 percent), followed by space, direct materials, maintenance, etc.

Inventory: Carrying costs tied to the current value of materials located at any stage in the distribution pipeline. In 1989, the inventory figure was calculated on an 18 percent cost-to-carry basis.

Customer service: The cost of people, space, materials and equipment needed to take customer orders or handle customer inquiries.

Administration: People-associated costs for managers and planners in the distribution function. (Note: With the exception of warehousing, administration costs are separated from direct expenditures reflected in other cost categories. For example, the transportation category reflects the cost of the freight bill, but not of the people who manage transportation. The sales, benefits, portion of overhead, etc., associated with those people would be folded into administrative costs.)

AVERAGE DISTRIBUTION COST BY INDUSTRY

	% of Sales	$/CWT
All Companies	8.18%	$43.32
Industrial Non-Durable	7.42	27.77
Chemicals	7.22	6.79
Industrial Durable	8.05	67.88
Ind. Durable <$10/pound	9.80	36.10
Ind. Durable >$10/pound	6.57	94.36
Consumer Non-Durable	7.82	29.88
Grocery	7.97	19.59
Food and Beverages	8.31	8.03
Dry and Packaged Food	7.28	8.90
Canned and Processed Food	7.98	5.15
Temperature Controlled Food	8.36	9.22
Non-Food in Grocery Channel	7.25	37.45
Consumer Household Products	8.02	13.09
Health and Beauty Aids	6.65	59.03
Pharmaceuticals	5.83	77.65
Consumer Druable	6.93	28.32
Wholesalers	11.39	63.26
Retail Companies	5.39	86.15

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WAREHOUSING

A Stake in the Ground

That's what our current research on the warehousing market amounts to. We need better data, not only for the industry, but for our own operations as well.

By Jay Gordon, Executive Editor

"It is clear that we in business logistics do not know very much about warehousing costs."

Robert Delaney
Cass Logistics

When Cass Logistics' Bob Delaney presented his research on the warehousing market to the Warehousing Education & Research Council this spring, he acknowledged that his efforts were "exploratory." With little time and resources, he was able to compile statistics for only half of the economy. "In this fast changing world, I am learning that it's necessary to make a continuing commitment to research in order to understand what's going on," Delaney said. "It is clear that we in business logistics do not know very much about warehousing costs." His findings, he said, are a "stake in the ground" that the industry can improve upon. A check of other resources, including the U.S. government, reveals no better information.

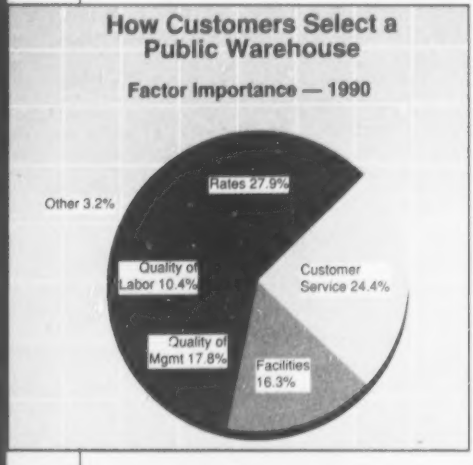
The fact that Delaney, one of this industry's best researchers, had a hard time putting together his warehousing presentation makes one wonder whether shippers find it equally difficult to pinpoint their warehousing costs. One public warehousing executive we spoke with recently said shippers increasingly ask for "open book" pricing arrangements, where the warehouser is expected to share specific cost data. "If they want to look at our costs, they need to know what a reasonable overhead is," this executive said. "One guy came in and said our overhead should be four or five percent. They just don't understand." He estimated that between 20 and 30 percent of the prospective customers they see don't know what they spend on warehousing. "It's kind of frustrating to be competing with a company-owned facility when they don't know what their costs are." When someone's job is hanging in the balance, he adds, "they're not eager to add up the costs." This certainly helps explain why third-party warehousing and other services have been slow to catch on. A good starting place might be defining exactly what "overhead" is.

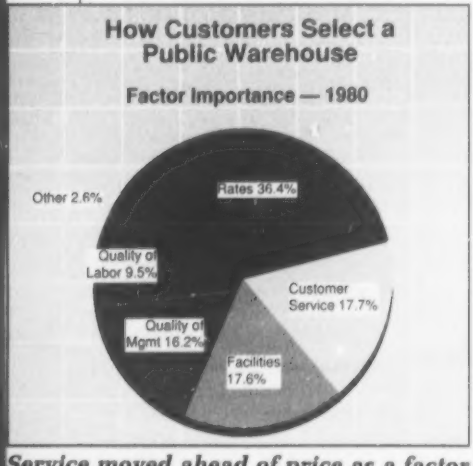
But now, companies are demanding to know what they spend in these areas. We have ample evidence that, in a weak economy, companies that don't see a good return on their investment decide they can do without. This has had a devastating impact on logistics assets, including personnel, in scores of U.S. companies. There is a lesson here: Know your true warehousing costs. It's the only way you can effectively manage and reduce them. ■

The Remaking of Public Warehouses

Growth will come largely from existing customers. To win new converts, providers must know what customers need.

By Jay Gordon, Executive Editor





Service moved ahead of price as a factor in the selection of a public warehouse.

During a presentation at this spring's American Warehouse Association meeting, Dr. Bernard J. "Bud" LaLonde illustrated a point with a story about the travails of shopping for office furniture. Using only wood chips and swatches of fabric, LaLonde placed an order. How long would it take? he asked. Ten weeks, the salesperson replied.

About six weeks into the order cycle, the salesperson returned to LaLonde's office. He said the wood parts of his order were finished, but that the mill had not yet produced the cloth to cover it. It would take an additional six weeks to complete the order.

"Now it's 16 weeks," LaLonde says, raising his voice slightly. "I told him, 'Somebody's going to figure out how to do this in only two weeks time, and you're going to be out of business.' Wouldn't you pay a higher price if someone said they could get your furniture to you in two weeks instead of 16? Isn't that customer value?"

The point LaLonde made was that providers of public warehousing must understand what creates value for their customers. They must become "Learning Organizations."

"The question is," LaLonde says, "can you really figure out what's happening out there and reconfigure your organization so you can serve customers better?"

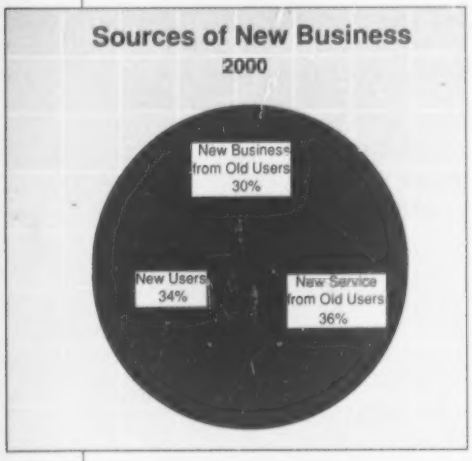
The Low-Hanging Fruit

The funny thing is, public warehouse providers say shippers need to become Learning Organizations too. Just 14 percent of the total potential warehousing market is currently being handled by third parties, yet public warehousers believe that two-thirds of their revenue growth will come from existing clients (see charts, page 81). The reason, they say, is that shippers don't yet fully understand—or aren't willing to accept—the benefits that public warehousing can provide.

"There is an inherent bias on the part of companies," says James Kennedy III, president of Cherokee Warehouses, Inc. "They will see themselves providing excellent service. But they forget that the only way we can stay in business is to provide that level of service too.

"The believers may only be doing 5 or 10 percent of their business with you, but as these corporations hollow out, if you have solutions to their problems you'll be in good shape," Kennedy adds. "But you've got to go for the low-hanging fruit. There is greater receptivity (toward third-party warehousing) today, but educating the logistics professional takes three years or more. You've got to make a living today."

Contract warehousing may be the only storage option that shippers say they're using more of, but that doesn't mean public facilities are



cooling their heels. "There are always emerging companies that need space and flexibility, and don't have the capital for their own facilities," Kennedy says.

Key Trends

Several trends that will affect both shippers and public warehouse vendors:

• **Strike one, you're out!** "You're not going to get three chances today," LaLonde says. "You're going to have to produce a quality product and offer a quality service, and do it right the first time."

• **Longer term relationships.** Shippers are committing for longer periods in order to bring investment cycles into synch with contract cycles, and delivery cycles into synch with production operations. "There's a whole set of synchronizations that we haven't looked at before," LaLonde says.

• **The scope and level of logistics outsourcing will increase.** Third parties will prosper by providing specific services for specific customers, and helping them solve business problems. Sitting by the phone and giving out storage and handling rates won't do it. "Customers are asking, 'Can you help me go from six to eight turns a year?' " LaLonde says.

• **Importing and exporting will play larger roles.** More and more companies are involved in some way overseas. This can be a potentially lucrative new area for public warehousing.

• **What was extraordinary yesterday will be routine tomorrow.** JIT deliveries used to be considered a special, value-added service for a public warehouse to offer. "Now, an order comes in at noon, it has to go out today. That's a regular thing," says Kenco/Cherokee's Jim Kennedy. "Twenty to 25 percent of our business is that type of value-added." Every public warehouse firm wants to avoid being classified as a commodity business, he adds. One way Kenco avoids that stigma is by providing service like the contract operation it runs for Whirlpool in Atlanta. Kenco handles all the logistics for one

continued

> *"We want to avoid capital investment in warehousing to allow us to focus on more vital areas."*
>
> *J.T. Ampuja*
> *Vice President, Logistics*
> *Rich Products Corp.*

Relative Rating of Benefits
Public, Contract and Private

Benefit	Rating Score: Private	Contract	Public
1. Lowest upfront investment	1.46	2.91	3.80
2. Easiest "sell" to upper management	2.42	2.76	2.94
3. Fewest labor problems	2.58	2.99	3.00
4. Widest range of logistics capabilities	2.84	3.00	3.06
5. Lowest delivered cost to customer	3.00	2.81	2.67

Scale: 1=Poor, to 4=Excellent; Source: Ohio State University

Relative Rating of Benefits
Public, Contract and Private

Benefit	Rating Score: Private	Contract	Public
1. Most responsive to shipper requests	3.69	3.13	2.45
2. Best customer service	3.64	3.12	2.54
3. Quickest emergency deliveries	3.61	3.11	2.61
4. Joint planning and forecasting with the shipper	3.59	3.08	2.32
5. Most reliable delivery service	3.50	3.06	2.63

Scale: 1=Poor to 4=Excellent; Source: Ohio State University

While public and contract warehousing may require the least amount of capital investment (left), third-party services won't increase their penetration of the private warehousing market until they are able to compete on a more equal footing in other areas (right).

What's your top warehousing priority?

"Cost reduction and cost avoidance are top priority in our organization. Goals have been established at all facilities which require employee participation. A major portion of our incentive packages is tied directly to cost of sales, which is impacted directly by cost reduction and avoidance."

George Altmeyer
Distribution Center Manager
Parker Hannifin Corp.

of the appliance maker's major distribution centers and eight cross-dock facilities. Using Whirlpool trucks and Kenco drivers, it delivers appliances right to the home or apartment complex and puts them in place. "We do everything except the final installation," Kennedy says.

The Changing Labor Force

One of the biggest challenges facing the public warehousing industry is managing an increasingly diverse labor force. Some key trends in this area include:

• **The aging work force.** Mandatory retirement legislation has been struck down, and workers are staying in the labor force longer. With more older workers in the labor pool, ergonomics will become increasingly important.

• **The second baby boom.** Look for another big influx of new workers in the 1995-2010 time frame.

• **Diversity.** By the year 2000, only 33 percent of the people coming into the work force will be white males. "There are no more Ozzie and Harriet or Brady Bunch stereotypes," says Dr. Michael McGinnis, professor of marketing & logistics at the University of South Alabama. "We're going to have to learn to manage a more sexually and culturally diverse work force."

• **Child care.** There is an ever increasing percentage of women with children in the work force, many of them at or near the poverty level. This has resulted in "a generation of children that are not as productive as they could be because of adverse childhood situations," McGinnis says. Employers face increased pressure to provide in-house child care.

• **Empowerment.** You might be sick of hearing about this, but it's a strategy companies will continue to embrace. "People are smarter than you give them credit for," says Jim Kennedy. "If you train them properly and allow them to be part of the solution, they'll surprise you with the job they do."

• **Dealing with disabilities.** The Americans With Disabilities Act is forcing employers to come to grips with this. "We have to broaden our 'comfort zones' in terms of who we're comfortable working with," McGinnis says. ■

DO CHECK THE INVENTORY, JAMES

The perfect English butler: attentive, alert, always anticipating the needs of others. That's what contract warehouses must model themselves after in the 1990s, says James Kennedy III, president of Cherokee Warehouses, Inc., a public warehouse firm.

"They are going to have to see the need of the customer before it becomes apparent and understand what, ultimately, they are trying to do," he says. "You have to get to the point where you are taking so much strain off of your customer that price becomes secondary. You become embedded in their company."

Kennedy doesn't believe the contract warehousing industry has progressed to that stage just yet, especially where rates are concerned. "Rates never take a back seat to much of anything," he says. Service *has* increased in importance, though. "If you're not in the ballpark on (service criteria), you won't be considered for the business," he says. "Once you become a player, though, rates are still very important."

The trends in logistics that affect warehousing bode well for the long-term viability of third-parties, he adds. The move toward smaller, decentralized DCs closer to customers appears to have reversed. "There's a trend today to fewer and larger DCs, and reduced headcounts," Kennedy says, "and that's giving contract warehousing a boost now. Contract warehousing is definitely seeing growth because of this concentration of product groups under one roof." ■

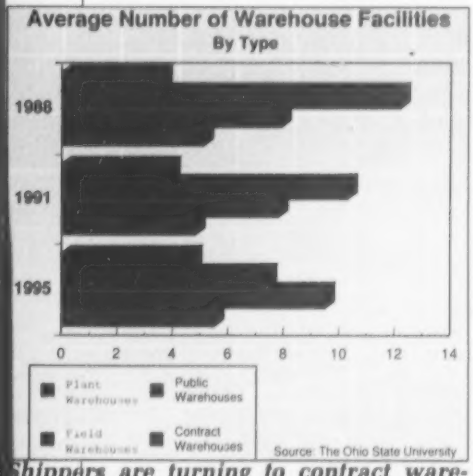
In Warehousing, Speed is King

Warehouses are evolving into cross-dock centers as shippers hold less inventory in fewer facilities, and deliver it faster, with fewer errors.

By Jay Gordon, Executive Editor

Has your use of third-party warehousing increased or decreased?

"Our company does not currently utilize third party providers, but we have initiated discussions with several contract logistics firms."
Lou Paoli
Transportation Logistics Manager
Schwinn Bicycle Co.



Shippers are turning to contract warehousing to improve asset productivity.

To understand the nature and extent of the changes that have occurred in private warehousing, consider the experience of the typical food manufacturer. Back in 1977, this company operated 14 field warehouses. Products were shipped from plants in box cars, sometimes in quantities as great as 1 million pounds. Deliveries by truck from the warehouses to retailers took three to five days.

Today, the typical food company operates five to seven warehouses, shipments from plants use intermodal and truck transportation, and orders are delivered to retailers overnight or on the second day.

"Shippers will use fewer warehouses, but they're going to pump more volume through them," says Dr. Bernard J. LaLonde, Mason Professor of Transportation & Logistics at Ohio State University.

What this all means, he says, is that speed will be king.

"What we've discovered is a basic truth: if you add time to an order cycle, you add costs. If you eliminate time, you create value for customers," says LaLonde. "We're figuring out how to do national, and even international distribution in one or two days."

To see how speed is affecting warehousing operations, consider the research LaLonde has done on a number of warehouse performance criteria (see charts, p. 86). By applying sophisticated logistics management, companies are doing more with less, and doing it faster with fewer errors. For example, order fill rates are steadily increasing, while back orders continue to drop—a trend that is expected to continue through the 1990s. When you consider that companies are holding less inventory in fewer places, this performance is impressive. The improvement in order fill rates may be attributed, at least in part, to the trend toward putting more SKUs under one roof (see profile, p. 88).

Order cycle times, and transit times are also trending downward, showing a 10 percent decline from 1988. The real eye-opener is that by 1995, companies expect to deliver orders in less than three days from receipt. Average transit time will be two days. "Just to be average, you're going to have to get (the order) out the door the same day," LaLonde says. "You want to talk about pressure on the logistics system?"

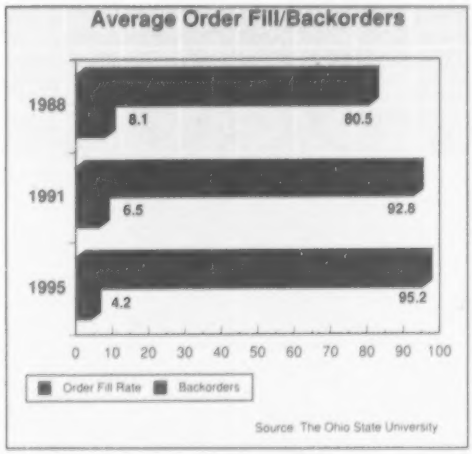
Inventory turns, another measure of speed, are also increasing. Inventory turnover has improved in all warehousing segments, but the biggest increase is in public and contract facilities. This suggests that companies are distributing faster moving items through public and contract warehouses, while slow movers are being centralized in company-owned warehousing.

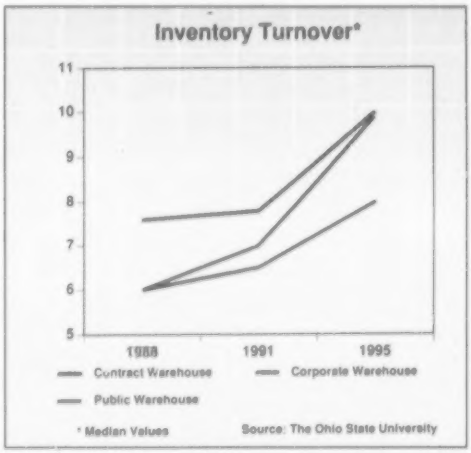
continued

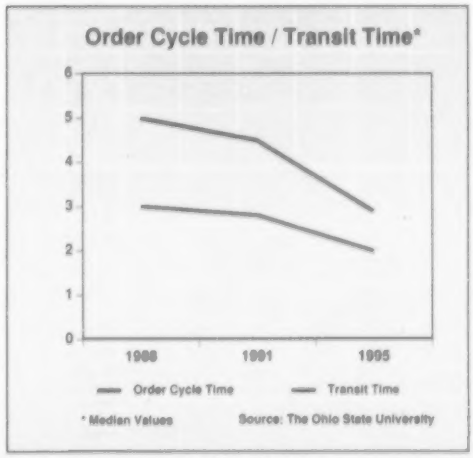
Finally, the growth of EDI confirms the importance of speed as a logistical strategy. The percentage of orders from customers transmitted by EDI is expected to double between 1991 and 1995, while the volume of EDI transactions between vendors and carriers is expected to triple. LaLonde says that by the year 2000, two-thirds of all shipments will move via "the electronic umbilical cord." This is the only way companies are going to be able to accomplish the predicted order cycle time reductions, he adds.

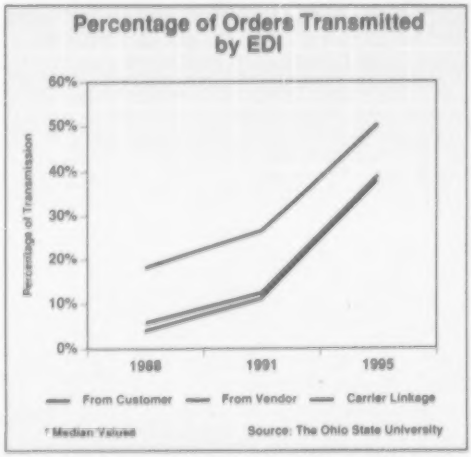
The Quest For Market Data

At the request of the Warehousing Education & Research Council, Robert Delaney, of Cass Logistics, has attempted to identify how much U.S. industry spends on warehousing. Extrapolating from existing data gathered by OSU's Dr. LaLonde, Delaney was able to pinpoint $23 billion in warehousing costs for the manufactured durable and non-durable segments of the economy. However, those segments represent only half the economy's final sales. Time and resources did not permit thorough









Companies are providing better service with less inventory, and they're doing it faster with fewer errors. Order fill rates have improved and will continue to do so. Order cycle times will go from five days in 1988 to three in 1995. Shippers expect third parties to pump up turns by 40 to 50% to support their logistics networks. How will they do it? EDI.

research into the other half—warehousing costs incurred in retail, wholesale, agriculture, mining, construction, transportation, utilities, import/export and services, such as telecommunications. Delaney used a formula-driven approach to arrive at an estimate for these industries. All told, he estimates that U.S. firms spend a total of $58 billion on warehousing. Calling his research "exploratory," he urged WERC, and individual shippers, to further his initial efforts to collect warehousing data.

Manufactured durable goods account for $1.45 trillion in sales, and companies spend approximately $12 billion on warehousing. About 13 percent of these products are shipped direct from manufacturing to the customer; two-thirds were shipped from private plant or field warehouses, and 20 percent were shipped from third-party facilities. In the non-durable segment, sales were $1.41 trillion and warehousing costs were $11 billion. Companies show a greater inclination to use third-party warehousing, however; 30 percent of non-durable goods were shipped from public or contract warehouses. About 57 percent were shipped from private facilities, and 12.5 percent were shipped direct.

Industry Breakdowns

Here is how shipments originate, by warehouse type, for six major industries: chemicals, food, automotive products, pharmaceuticals, paper and electronics:

- **Food products:** Private warehouses account for 57 percent of shipments; public and contract facilities, 31 percent; 12.5 percent are shipped direct.
- **Paper products:** More than half of paper product shipments originate in a privately owned plant warehouse, and another one-fourth are shipped direct to customers. The rest is split evenly between private field warehouses and public or contract warehouses.
- **Chemicals & plastics:** About

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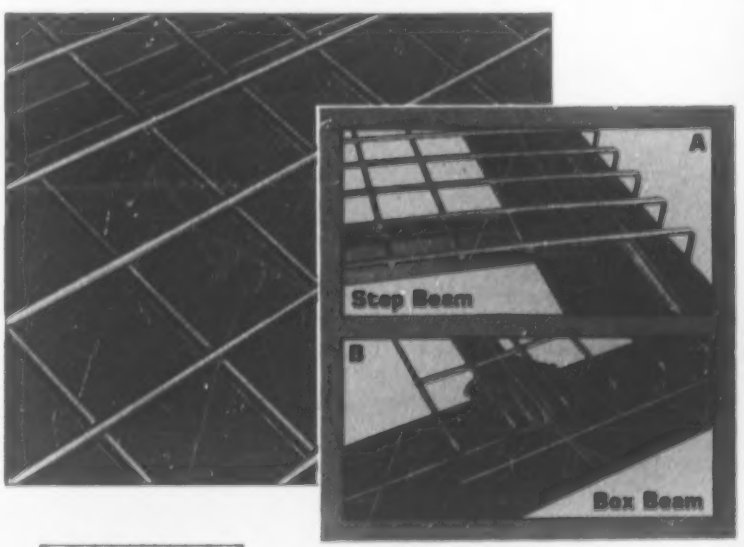

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16 percent of these shipments originate in a contract warehouse. This means the chemical industry depends more on contract warehousing than any other surveyed—nearly twice as much as the food industry, which is the next largest user. This may be a big reason that contract warehousing was the only segment to increase its market penetration over the 1988 to 1991 period. All other segments—private and public—declined slightly (see chart, p.84). Another 22 percent of chemical shipments come from public facilities, private warehousing accounts for 40 percent, and 22 percent are shipped direct.

• **Automotive products:** Despite relatively high costs and low productivity, the automotive industry continues to lean heavily on private warehousing—86 percent of shipments are handled through private DCs. This is done primarily to control JIT movements. Though many public warehouse firms have made great strides in meeting the requirements of service-intensive industries like car making, there is a strong bias here they must overcome. Contract warehousing has less than 1 percent of this market, public warehouses only 7.5 percent.

• **Pharmaceuticals:** Although 72 percent of these shipments moved through private DCs, drug companies are one of the largest users of public warehousing, and their use of contract warehousing continues to grow.

• **Electronics:** Nearly 84 percent of shipments come from a private DC, while just 6 percent originate in a public warehouse. The electronics industry is the only one of the six surveyed here that had little or no participation in contract warehousing.

LaLonde says that 61 percent of the shippers surveyed said they had made a major change regarding outsourcing in the past five years, and virtually everyone said they view outsourcing more positively now. "People want asset productivity," he says. The key question shippers are asking third party providers is, "Can you help me?" ■

PRIVATE WAREHOUSING GIVES BAXTER FLEXIBLE DISTRIBUTION

In 1989, Baxter Healthcare Corp. decided its current distribution network was not optimally configured to serve its client hospitals. The Distribution Services Division (DSD), charged with charting a new strategy, explored three options: Use multiple contract warehouses, use existing facilities more efficiently, or develop a new network. DSD, along with other departments, examined the cost and service implications of each option—and chose the latter.

Baxter's 80 DCs, mostly company-owned, would be reduced 50 percent by consolidating smaller facilities into highly automated "Super DCs." DSD's recommendation called for a $400 million investment. "It was a big gamble," concedes DSD President Henry Autry. "We'd never built one of these before."

The project is now in full swing. The first of the Super DCs opened last fall, and the early returns are encouraging. Order accuracy improved 6 percentage points to top 99 percent, line fill rates are up because the larger facility stocks more SKUs, inventory accuracy has improved and productivity is trending upward. The new facilities and their updated technology also enable Baxter to give customers what they want: flexible distribution. "They want us to do things the way their receiving department requires it, from invoicing to the way product is placed on a pallet," Autry says.

DSD shunned contract warehousing because it would have resulted in multiple handlings and customers getting four or five different deliveries. "Customers wanted *one* Baxter," Autry says, "and that scenario did not give them one Baxter."

Information Keys Warehouse Market

Look for acceleration of the shift in capital spending to systems that move information faster and more efficiently.

By Jay Gordon, Executive Editor

Warehousing, like many other areas in logistics, is being driven by the need for fast, accurate information.

For proof, you only need to see where companies are projected to spend their capital equipment dollars in the next several years. The worldwide market for automatic identification products—bar code, radio frequency and other types of data collection systems—will more than double by 1995, predicts market research firm Frost & Sullivan. U.S. demand should follow a similar growth curve (see charts below). The market for automated material handling equipment, meanwhile, is expected to remain flat, with a couple of exceptions (see page 90).

While auto ID may have special appeal in a soft economy (see profile, page 91), its value doesn't diminish when business is strong. "In good economic times it allows you to manage growth and expansion, and to put money into your core business," says Alan Gold, director of strategic marketing services for Symbol Technologies.

Probably the main reason companies are embracing auto ID in increasing numbers is because the returns are quick and substantial. But other factors come into play also:

• **More and more users are being forced into auto ID.** Increasing numbers of companies are mandating that component and finished good shipments from suppliers be bar coded. "Driving forces such as electronic tracking of inventory, JIT and Quick Response are pushing potential users into a corner, from which they must decide the most logical format and technology to institute," the Frost & Sullivan study says.

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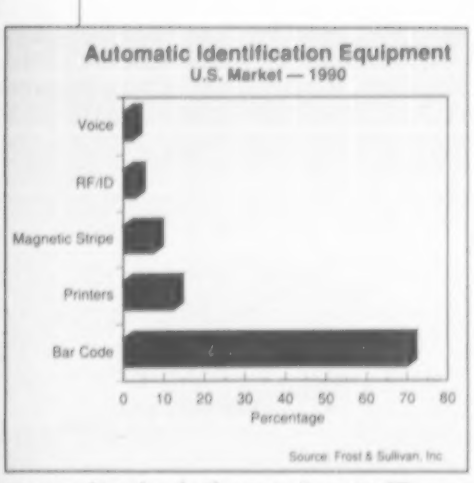


Bar coding leads the way in auto ID markets because it is the most reliable, accurate and easy to implement technology.

The Worldwide Auto ID Market Shipments from U.S. Manufacturers	
1990	$2.6 billion
1991	$3.1 billion
1995*	$7.1 billion

Source: Frost & Sullivan; * projection

The U.S. Demand	
1990	$1.7 billion
1991	$2.0 billion
1995*	$4.6 billion

Source: Frost & Sullivan; * projection

Auto ID Equipment Sales Bar Code Devices	
1990	$1.79 billion
1991	$2.14 billion
1995*	$4.82 billion

Source: Frost & Sullivan; * projection

Auto ID Equipment Sales Printers	
1990	$316 million
1991	$389 million
1995*	$976 million

Source: Frost & Sullivan; * projection

• **New technology.** Manufacturers are constantly coming up with scanners that are smaller, lighter and faster. Bar codes, too, contain more and more information in less and less space.

• **The declining cost of hardware.** Especially scanners, printers and data terminals; in printers, for example, there have been significant developments at the low end of the market that make the technology accessible to companies that cannot afford more expensive equipment.

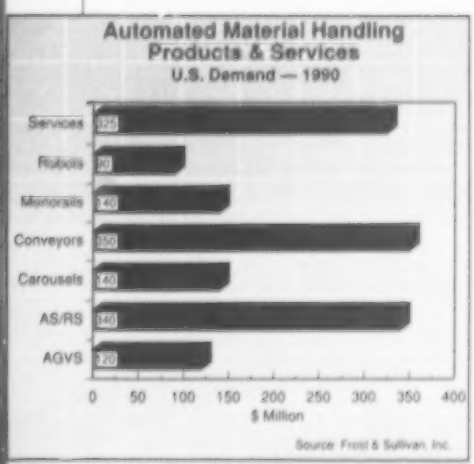
Auto ID's surge will be led by bar coding (see chart, page 89). A study by Market Intelligence Research Corp. (MIRC) outlines reasons for bar code's wider acceptance:

• **Nothing succeeds like success.** Companies that use bar coding report great success, including significant savings in time and labor costs and improved productivity.

• **Developments in related technologies have made bar coding more attractive.** Radio frequency, in particular, has improved the usefulness of bar coding, as communication between data terminals and host computers is improved.

• **Bar coding is becoming more accessible.** With the development of standards and a reduction in price for certain types of equipment, bar coding is becoming available to increasing numbers of small- and medium-sized companies.

• **Increased education.** Groups like the Automatic Identification Manufacturers (AIM) have made great strides in educating companies both here and in Europe about the advantages of auto ID. Bar coding is perhaps the easiest technology to understand, since it is already famil-



Growth in many AMH categories is flat. The market for services will grow because successful specification, design and installation of automated equipment requires high skill levels. Demand for conveyors should remain strong.

Material Handling Equipment Market Conveyors	
1990	$350 million
1995*	$390 million

Source: Frost & Sullivan; * projection

Material Handling Equipment Market Services	
1990	$325 million
1995*	$342 million

Source: Frost & Sullivan; * projection

Material Handling Equipment Market AS/RS	
1990	$340 million
1995*	$292 million

Source: Frost & Sullivan; * projection

What technology makes the biggest impact on your warehouse?

"Bar coding has proved an effective method of handling reusable container inventory information."

Andrew A. Twarowski
Customer Service Operations Manager
FMC Corp.

"We have in place an EDI system that enables our distributors to have direct access to via PC to our order entry and shipment information. Systems-driven carousels and bar coding are our next projects."

George Altmeyer
DC Manager
Parker Hannifin Corp.

iar to most people through checkout and retail point-of-sale scanning.

Other trends MIRC says will influence auto ID markets over the next several years:

• **Integration.** Now you can get scanner, decoder, data collection terminal and printer all in one package. Devices that integrate the various data collection functions into a single unit will be the most popular. This trend is evident in software as well. As software is written for more and more applications, these will be integrated with other existing applications.

• **Standardized symbologies.** The ability of certain market segments to standardize is a big reason bar codes have succeeded. The UPC code, which was developed for the supermarket industry and is now widely used in retailing, is a prime example. Still, single industry standards can create confusion when products are produced for distribution to numerous markets and countries. A movement is under way to take standardization to the next level by creating a broad-based, consumer-responsive "open system" for auto ID. This system would enable manufacturers and customers in a wide range of industries worldwide to share information through the use of bar code scanning.

• **Off-the-shelf packages.** As software and hardware become more widely available, more standardized and more affordable, users will increasingly buy off-the-shelf packages. Symbol Technologies recently introduced a kit that comes with a hand-held laser scanner, PC interface, cable, power supply, user's manual and other accessories at a list price of $1,495. The system is easily installed, even for non-technical users.

• **Improved customer service.** Hardware and software are becoming increasingly sophisticated, creating a need for better service and

continued

TURNKEY SOLUTIONS

The recession has been driving the business climate for the better part of two years, and that's just the way Intermec likes it.

"Capital budgets are smaller, and people are more reluctant to spend," acknowledges John Paxton, president of the Everett, Wash., automatic identification manufacturer. "But they need to increase their productivity by adding wisely to their overall capabilities." Usually, the "additions" Paxton refers to are in the form of systems that substitute information for inventory and move goods more efficiently; this bodes well for Intermec and its new parent, the Industrial Automation Division of Litton Industries.

"That," says Paxton, "is where the synergies between Litton and Intermec pay off. We can combine highly efficient material handling with real time information management." Like an automatic sortation system that can scan and read bar coded information traveling by at a mere 500 feet per minute. Paxton believes that the ability to combine material handling and auto ID hardware with the software that ties them together is a powerful asset. "We are able to provide a turnkey operation," he says. "That's what today's more sophisticated buyers are looking for."

In the early stages of the recession, Paxton says, many of Intermec's orders "slid to the right," as top management reexamined its spending priorities to determine which projects promised the greatest return. Even though the typical payback on bar code or automatic sortation systems is a year or less, this period of reconsideration was enough to slow Intermec's growth temporarily. Now, though, users appear to be convinced that they need the benefits these systems provide. "Our business is picking up much faster than the economy in general," Paxton says, and with Litton and Intermec customer bases that are complementary, "we'll grow faster than the industry as a whole." ■

What technology makes the biggest impact on your warehouse?

"AS/RS, because it has improved our productivity, especially in the pick/pack area."

Lou Paoli
Transportation Logistics Manager
Schwinn Bicycle Co.

"We're in the midst of evaluating a new warehouse management system in one of our facilities, which represents our first venture into bar coding and RF equipment."

Dennis T. Andruskiewicz
Vice President-Distribution
The Martin-Brower Co.

maintenance. Users are also demanding better support, especially in documentation.

SLOW GROWTH

In a survey of 500 automated material handling users, Frost & Sullivan reports that 87 percent indicate they have realized the expected benefits of their equipment purchases. Yet they do not plan to increase spending significantly in this category.

Department of Commerce data indicates that only 25 percent of manufacturers with 500 employees or more are using automatic storage & retrieval systems (AS/RS), and just 13 percent use automated guided vehicles. Despite these low levels of market penetration, demand appears to be flat for this equipment.

What is holding back the development of these systems? According to Frost & Sullivan, there are several reasons:

- Cost justification
- Lack of understanding of the deficiencies of human-based systems
- Reluctance to change to something less familiar.

The U.S. demand for AMH equipment was $1.5 billion in 1990, and 20 percent of that was services related to the design, installation and integration of equipment. There are three basic types of suppliers in this market: companies that make products and offer integration services, those that only make products, and those that offer only services, such as integration, simulation or installation. As the complexity of AMH systems increases, more and more customers are looking to outside suppliers for these services.

Another bright spot is the market for conveyors, one of the few growth areas for AMH equipment. Once thought of as simply a set of casters and a strip of rubber, the conveyor is emerging as a prized weapon in the fight for productivity. "Computers and bar coding have elevated the simple conveyor to new highs in capability," Frost & Sullivan notes.

Forecasts for AS/RS are mixed.

U.S. Lift Truck Shipments

No. of Units Sold

Year	Electric Rider	Motorized Hand	ICE
1981	19,784	18,734	31,885
1982	14,859	13,988	18,533
1983*	16,227	16,237	26,245
1984	23,983	21,958	45,338
1985	26,400	22,493	47,844
1986	25,818	24,589	46,195
1987	24,928	24,857	47,945
1988	29,202	27,205	48,535
1989	31,010	29,838	55,104
1990	27,877	26,941	47,702
1991	24,565	23,599	38,406
1992**	6,379	6,678	9,862

Source: Industrial Truck Association; *the first year shipments of Japanese members were included. **1Q only. ICE–Internal Combustion Engine.

Frost & Sullivan says that AS/RS' initial growth phase has passed (see chart, page 90). Carousels will remain a hot item because of their efficient application in parts and small item storage.

MIRC, meanwhile, estimates the total U.S. market for AS/RS at $461 million in 1990, and forecasts it will surpass $775 million by 1997—an annual growth rate of 7.7 percent. (MIRC's market figure is higher than Frost & Sullivan's may be because it includes racks, bins, drive mechanisms and control hardware and software in its estimate.)

An increasingly important part of the AMH market is the use of recycled systems. AS/RS has been especially viable in this area. As modern facilities are "decommissioned" in the wake of takeovers and bankruptcies, suppliers have sprung up that specialize in reconditioning and reinstalling AMH systems. This can mean replacing the electronics with more advanced systems, moving entire systems to new facilities or expanding by adding equipment from a deactivated site. This trend has the effect of reducing demand for new equipment, but it also creates demand for AMH equipment that might not otherwise exist at the price levels of new equipment.

LIFT TRUCKS GO GREEN

The lift truck industry appears to be emerging from a two-year slump in sales that, like the softness in other capital equipment categories, can be attributed to the recession. In fact, a pattern is emerging in which lift truck sales rebound vigorously following a recession. "It might not get

continued

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back to 1990 levels," says David Crocker, a consultant with Power Systems Research in St. Paul, Minn. "But people said (after the recession in the early 1980s) that the market would never get back to where it was in the late 1970s, either. Then we had a year like 1989." (see chart, p. 92)

Perhaps the biggest factor affeeting lift truck markets today is the push for environmentally sound equipment. The Environmental Protection Agency is pushing to regulate off-highway industries, including lift trucks. Unions will play a role in this "green" movement also, as they make bans on diesel lift trucks part of their bargaining platform.

All of which opens the door for manufacturers of electric vehicles. "By the end of the decade, we're going to be driving around in electric cars," Crocker says. Some off-highway vehicles, such as the tow tractors used in airports, will soon be mandated electric vehicles. "It's apparent that's where the forklift industry is heading," Crocker says. "There has been a significant swing toward electric engines from internal combustion, and it is going to accelerate." Given a choice between electric and IC trucks with similar performance characteristics, more and more buyers are choosing electric even though they are significantly more expensive. However, in terms of life cycle costs, including maintenance and fuel, electric trucks usually net out lower than IC vehicles.

Manufacturers have not ignored their IC product lines. Hyster, for example, recently introduced a 6-cylinder fuel-injected engine that should result in fuel savings and lower emissions. Also, Toyota's 1992 models will have a three-way catalytic convertor that will reduce nitrous oxide emissions in its liquid propane gas (LPG) and gasoline-powered forklifts. Toyota says the system will help its trucks meet the forklift emission standards expected from the California Air Resources Board, a leader in setting emission standards for off-highway vehicles. ■

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